

# FLORA OF PANAMA

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## Part III. Fascicle 2

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### ORCHIDACEAE

By LOUIS O. WILLIAMS

Epiphytic, terrestrial, rarely semi-aquatic or saprophytic, perennial herbs. Vegetative growth of two main types: (1) Termed MONOPODIALES, in which the main axis or stem grows steadily upward year after year, the annual growths at length being indistinguishable and a monopodium being formed; the inflorescences borne on lateral shoots. (2) Termed SYMPODIALES, in which a new growth develops laterally from the base of the previous year's growth, which is completed and matures in a few months. In the SYMPODIALES if the annual growth is terminated by an inflorescence the plant is termed *acranthous* (terminal flowering); if the inflorescence originates on lateral branches (usually at the base of or laterally on a pseudobulb) and the annual growth is terminated only by leaves the plant is termed *pleuranthous* (lateral flowering). Stems (secondary) of many orchids developed into thickened or swollen structures (pseudobulbs) which act as storage organs for food and moisture. Flowers hermaphroditic and gynandrous, occasionally monogamous or polygamous, the male and female ones being very different; zygomorphic; superior. Perianth of two tripartite whorls, alternating, often variously united; in the same whorl the even pair similar, the odd one usually different in form. Sepals 3, similar, or the dorsal differing from the laterals, free or variously united. Petals 3, two similar and termed petals, the other one usually strikingly different and termed lip or labellum. Stamens in two tripartite whorls, only one (MONANDRAE) or two (DIANDRAE) fertile, the others, along with the styles and sterile stigmas, forming the column by consolidation; in the MONANDRAE the odd stamen of the outer whorl fertile; in the DIANDRAE the paired stamens of the inner whorl fertile. Pollen (except in the CYPRIPELOIDEAE) usually consolidated into pollinia. Stigmas 3, usually only one or two fertile (if two, often confluent and appearing as one). The column, the central structure in the flowers, which is made up of the consolidated styles and filaments along with the suppressed anthers and stigmas, is diagnostic of the family. Fertile anthers and stigmas usually borne toward the apex of the column. Ovary 1-celled or rarely 3-celled. Seeds numerous, minute, lacking endosperm.

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A cosmopolitan family of about 600 genera and 15,000–20,000 species. Most abundant in tropical regions of the world.

The Orchidaceae is an extremely complex family, the morphology of which is often not too well understood. The genera, in some groups, are technical and perhaps not too well differentiated; in other groups they are fairly well differentiated. With the exception of a few terrestrial genera and even fewer of the epiphytic ones, the respective genera are limited to either the eastern or to the western hemisphere. A few genera contain a very large number of species (*Dendrobium*, eastern hemisphere, probably more than 1000; *Epidendrum*, western hemisphere, possibly nearly 1000). The species of orchids, as a whole, are distinctive, and extreme variation within species is not too common. Terrestrial species, especially those of temperate climates, are inclined to be more variable than are epiphytic ones. Species are inclined to be restricted in distribution although terrestrials and epiphytes growing at low elevations often range widely.

The greatest concentrations of orchids occur within twenty degrees of the equator. While some are found at low elevations, the great majority of them grow on mountains within the tropics. Malaysia and tropical America are richest in species and genera, with Africa a poor third. New Guinea probably contains more species than any comparable land area, although it is still not well known botanically. Colombia is perhaps the richest in species of any comparable area in the western hemisphere.

#### KEY TO THE SUBFAMILIES, TRIBES AND GENERA

- a. Stamens 2, a third usually transformed into a large staminode; pollen granular, not united into masses or bodies.....Subfamily DIANDRAE  
(Tribe I CYPRIPELOIDEAE)
- aa. Stamen 1, the laterals abortive or forming staminodes; pollen consolidated into masses or solid bodies (pollinia).....Subfamily MONANDRAE
  - b. Caudicle and gland arising from the base of the pollinia; anthers erect or more or less resupinate, very closely adnate to the broad-based column, never deciduous after flowering; pollinia always granular (sectile) .....Tribe II OPHRYDOIDEAE
  - bb. Caudicle and gland arising from the apex of the pollinia; anthers erect or incumbent, the filaments short and slender, generally narrowly joined to the column, usually deciduous but if persistent soon withering.
    - c. Pollinia granular, soft; anthers commonly persistent but withering; inflorescence (normally) always terminal.....Tribe III POLYCHONDRAE
    - cc. Pollinia waxy or cartilaginous; anther commonly soon deciduous; inflorescence terminal or lateral .....Tribe IV KEROSPHAERAE

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- I. Subfamily DIANDRAE, Tribe CYPRIPELOIDEAE. Two genera in Panama.
    - a. Stems elongated, leafy; leaves thin..... 1. SELENIPEDIUM
    - aa. Stems very short or apparently none, leaves coriaceous..... 2. PHRAGMIPEDIUM
  - II. Subfamily MONANDRAE, Division BASITONAE, Tribe OPHRYDOIDEAE.
    - a. One genus in Panama..... 3. HABENARIA
  - III. Subfamily MONANDRAE, Division ACROTONAE, Tribe POLYCHONDRAE. Twelve genera distributed in five subtribes in Panama.
    - a. Anther more or less prone, incumbent.



- b. Leaves not articulated, persistent; stems not cane-like.
- c. Terrestrial herbs with fleshy roots; small or large rather showy purplish flowers..... 4. *POGONIA*
- cc. Scandent herbs, usually epiphytic, without fleshy roots; flowers large, usually white..... 5. *VANILLA*
- bb. Leaves articulated, caducous; stems cane-like.
- c. Pollinia 8.
- d. Base of the lip strongly gibbous or subsaccate, ornamented with two prominent calli; flowers relatively small..... 6. *ELLEANTHUS*
- dd. Base of the lip not strongly gibbous or subsaccate, with or without calli at the base; flowers relatively very large..... 7. *SOBRALIA*
- cc. Pollinia 4..... 8. *PALMORCHIS*
- aa. Anther more or less erect; rostellum erect or suberect.
- b. Leaves not plicate-nerved, usually soft.
- c. Roots fasciculated.
- d. Lip uppermost, adaxial; flowers not resupinate.
- e. Petals, and sometimes the lip, inserted on the column..... 12. *PONTHIEVA*
- ee. Petals and lip not inserted on the column.
- f. Lip inserted at the base of the column, free.
- g. Sepals not united into a basal tube..... 11. *CRANICHIS*
- gg. Sepals united at the base into a slender tube..... 9. *STENOPTERA*
- ff. Lip united at the base to a cup formed of the united sepals, helmet-shaped..... 10. *PRESCOTTIA*
- dd. Lip lowermost, abaxial; flowers resupinate..... 13. *SPIRANTHES*
- cc. Roots not fasciculated, arising from the nodes on the lower part of the stem or rhizome..... 14. *ERYTHRODES*
- bb. Leaves plicate-nerved, chartaceous or subcoriaceous..... 15. *CORYMBORCHIS*
- IV. Subfamily *MONANDRAE*, Division *ACROTONAE*, Tribe *KEROSPHAERAE*.  
Seventy-two genera, distributed in twenty-six subtribes, in Panama.
- a. Series A. *ACRANTHAE*. Inflorescence normally terminal or by abortion of terminal inflorescence axillary in uppermost leaves. (See also *LOCKHARTIA*).
- b. Viscid disc, when present, arising from the apex of the pollinia, commonly irregular, rudimentary or none.
- c. Ovary articulated to the pedicel; pedicel persistent; stems slender, rigid, sometimes reduced, usually unifoliate.
- d. Sepals all distinctly connate at the base.
- e. Sepals also connate at their tips, open between tips and bases.... 18. *CRYPTOPHORANTHUS*
- ee. Sepals not connate at their tips.
- f. Sepals forming a narrow or campanulate tube at the base.
- g. Inflorescence a raceme..... 17. *PHYSOSIPHON*
- gg. Inflorescence a single flower, or rarely 2 flowers..... 19. *MASDEVALLIA*
- ff. Sepals more or less rotate, not forming a narrow tube at the base..... 16. *STELIS*
- dd. Sepals not all distinctly connate at the base, at least the dorsal sepal free or nearly free.
- e. Blade of the petal transverse, i. e. strongly bilobed (except *L. eximia*)..... 21. *LEPANTHES*
- ee. Blade of the petal not transverse, not strongly bilobed.
- f. Petals inserted on the column-foot; lip with a hood-shaped callus or ligule at the base..... 22. *ACOSTAEA*
- ff. Petals not inserted on the column-foot nor with a hood-shaped callus or ligule at the base.
- g. Inflorescence terminal or at least subterminal on the secondary stems..... 23. *PLEUROTHALLIS*
- gg. Inflorescence originating about the middle of the secondary stems..... 20. *SCAPHOSEPALUM*
- cc. Ovary not articulated to the pedicel; pedicel caducous with the flower; stems slender or fleshy, 1- to several-flowered.
- d. Pollinia without appendages, i. e. no viscid disc or caudicle.
- e. Column very short; anthers sessile in the clinandrium, erect.... 24. *MALAXIS*
- ee. Column elongated; anther terminal, incumbent..... 25. *LIPARIS*
- dd. Pollinia appendaged, i. e. with at least a rudimentary viscid disc or a caudicle with a viscid apex.



- e. Column footless; lip more or less connate with the base of the column.
- f. Pollinia 4, two in each cell of the anther.
- g. Lip geniculate at its junction with the column..... 26. *HEXISEA*
- gg. Lip not geniculate at its junction with the column.
- h. Flowers large and showy; stems always pseudobulbose.. 29. *CATTLEYA*
- hh. Flowers usually not large and showy; stems either pseudobulbose or ebulbose.
- i. Lip with two large hollow horn-like processes; lip free or nearly so..... 28. *DIACRIUM*
- ii. Lip without hollow horn-like processes; lip commonly connate with the column at base but not always so..... 27. *EPIDENDRUM*
- ff. Pollinia 8, four in each cell of the anther.
- g. Pollinia of two sizes, unequal..... 31. *BRASSAVOLA*
- gg. Pollinia of one size, equal..... 30. *LAELIA*
- ee. Column produced into a distinct foot at the base; lip hardly connate to the column or at most connate at the base of the column-foot.
- f. Pollinia 4 or 6.
- g. Leaves distichous and scattered along an elongated stem.
- h. Pollinia 6..... 33. *PLATYGLOTTIS*
- hh. Pollinia 4..... 34. *ISOCHILUS*
- gg. Leaves not distichous on an elongated stem, terminal from pseudobulbs or short indurated stems..... 32. *SCAPHYGLOTTIS*
- ff. Pollinia 8..... 35. *COELIA*
- bb. Viscid disc distinct, regular, with the margins well defined, arising from the apex of the column.
- c. Column with a foot; plants with pseudobulbs; pollinia 4, or 4 joined into two pairs.
- d. Lip with a spur..... 37. *GALEANDRA*
- dd. Lip without a spur..... 36. *POLYSTACHYA*
- cc. Column footless; plants without pseudobulbs; pollinia 2..... 38. *EPIDANTHUS*
- aa. Series B. *PLEURANTHAE*. Inflorescence lateral, arising near the base of the pseudobulb or in the axils of the lower leaves or sheaths. (This series contains two subseries.)
- A. Subseries a. *SYMPODIALES*. Plants forming a sympodium, i. e. the stems approximate or superimposed and the apical growth manifestly terminal.
- B. Pollinia without a stipe; viscid disc commonly rudimentary or the apex of the caudicle glutinous or none.
- C. Rhizome short; terrestrial plants with the stems bulbose, usually partially buried in the ground; leaves plicate.....
- D. Lip with a spur..... 39. *CALANTHE*
- DD. Lip without a spur..... 40. *BLETIA*
- CC. Rhizome more or less elongated; plants epiphytic with pseudobulbose stems 1- to many-leaved; leaves plane or plicate.
- D. Pseudobulbs homoblastic (i. e. of several nodes, only the terminal one of which bears leaves), fusiform, many-leaved; leaves plicate, thin; flowers relatively large..... 41. *CHYSIS*
- DD. Pseudobulbs heteroblastic (i. e. of a single node with one or more terminal leaves), usually small; leaves coriaceous or fleshy, not plicate; flowers relatively small..... 42. *BULBOPHYLLUM*
- BB. Pollinia with a prominent stipe, sometimes short; viscid disc distinct.
- C. Pollinia of a waxy texture, easily mashed.
- D. Lip spurred or with a saccate base..... 43. *EULOPHIA*
- DD. Lip not spurred nor saccate at the base.
- E. Lateral sepals and column forming a prominent mentum; base of the leaves and peduncle not enclosed in a submembranaceous sheath..... 44. *WARREA*
- EE. Lateral sepals and column-foot forming an inconspicuous mentum; base of the leaves and peduncle enclosed in a submembranaceous sheath..... 45. *GOVENIA*
- CC. Pollinia cartilaginous in texture, not easily mashed.



- D. Leaves convolute in vernation.
- E. Pseudobulbs large, fusiform, homoblastic, many-leaved.
- F. Flowers perfect, monomorphic; column twisted..... 46. *MORMODES*
- FF. Flowers dimorphic or trimorphic (rarely perfect); column not twisted.
- G. Column thick, straight, in male flowers usually with two retrorse antennae..... 47. *CATASETUM*
- GG. Column slender, curved or arcuate, without retrorse antennae..... 48. *CYCNOCHES*
- EE. Pseudobulbs short, heteroblastic, 1- to few-leaved.
- F. Lip continuous with the base of the column or solidly attached to the short column-foot, not articulated, more or less prominently divided into an epichile and a hypochile or rarely entire.
- G. Petals very much narrower than the sepals, usually inserted on the base of the column.
- H. Epichile saccate and bucket-like..... 57. *CORYANTHES*
- HH. Epichile not saccate..... 56. *GONGORA*
- GG. Petals not distinctly narrower than the sepals, from a little narrower to broader.
- H. Epichile saccate and bucket-like..... 57. *CORYANTHES*
- HH. Epichile not saccate.
- I. Lateral sepals connate and forming a distinct mentum at the base; flowers about 1.5 cm. long, fleshy..... 49. *COELIOPSIS*
- II. Lateral sepals free or if connate not forming a distinct mentum at the base.
- J. Lip entire..... 50. *SIEVEKINGIA*
- JJ. Lip not entire, usually divided into a hypochile and an epichile.
- K. Hypochile of lip concave-saccate; apex of lip shallowly 3-lobed, the epichile obscure..... 55. *STANHOPEA*
- KK. Hypochile of lip usually not concave-saccate or if so then the lip distinctly divided and lobed.
- L. Epichile or terminal lobe of lip narrowly lanceolate, acuminate..... 54. *NEOMOOREA*
- LL. Epichile or terminal lobe of lip not narrowly lanceolate, acuminate.
- M. Lateral lobes of the lip (pleuridia, mesochile) erect or at least not parallel to the epichile.
- N. Rachis of inflorescence and sepals dorsally brown pilose-pubescent..... 51. *KEGELIELLA*
- NN. Rachis of inflorescence and sepals not pubescent.
- O. Lateral lobes of the lip joined by a large central callus; hypochile of the lip long, at least as long as the lateral lobes..... 52. *ACINETA*
- OO. Lateral lobes of the lip not joined by a central callus; hypochile of the lip short and inconspicuous..... 53. *PERISTERIA*
- MM. Lateral lobes of the lip (pleuridia) more or less parallel to the epichile, ensiform.... 55. *STANHOPEA*
- FF. Lip articulated to the apex of the column-foot.
- G. Inflorescence basal, i. e. arising from the base of the pseudobulb; lip usually provided with a long low callus.
- H. Inflorescence consisting of a single flower..... 60. *LYCASTE*
- HH. Inflorescence a few- to several-flowered raceme.
- I. Flower with a conspicuous spur-like mentum..... 58. *XYLOBIUM*
- II. Flowers without a conspicuous spur-like mentum.... 59. *BIFRENARIA*



- GG. Inflorescence suprabasal, i. e. in the axils of the lower sheaths; lip usually provided with a transverse callus or crest..... 61. ZYGOPETALUM
- DD. Leaves conduplicate in vernation.
- E. Column produced into a foot and forming a mentum with the lateral sepals; rostellum hardly produced, emarginate.
- F. Callus of the lip transverse, often flabellate, at the base of the lip; inflorescence suprabasal, i. e. in the axils of the sheaths or sheath-like leaves; pseudobulbs reduced or rudimentary.
- G. Callus at the base of the lip pectinate or fringed..... 64. HUNTLEYA
- GG. Callus at the base of the lip not pectinate or fringed.
- H. Lip entire or but obscurely lobed..... 62. CHONDRORHYNCHA
- HH. Lip lobed, or divided into a narrow basal and a broad apical part..... 63. WARSZEWICZELLA
- FF. Callus of the lip longitudinal, often inconspicuous or rarely none; inflorescence borne from the base of a pseudobulb; pseudobulbs often well developed or forming elongated stems.
- G. Lateral sepals forming a spur at their base about as long or longer than the blades of the sepals..... 67. CRYPTOCENTRUM
- GG. Lateral sepals not forming a long spur.
- H. Sepals connate and forming a short tube at the base; lip not half as long as the sepals..... 66. TRIGONIDIUM
- HH. Sepals not connate and forming a tube at the base; lip usually at least half as long as the sepals..... 65. MAXILLARIA
- EE. Column footless; rostellum commonly produced, sometimes subulate or acute.
- F. Anther incumbent; rostellum porrect or deflexed, never ascending.
- G. Base of the lip spurred or saccate or appendaged at the base.
- H. Base of lip forming a spur or deeply saccate.
- I. Lateral sepals free..... 68. TRICHOCENTRUM
- II. Lateral sepals connate..... 70. RODRIGUESIA
- HH. Base of the lip with short to long appendages; lateral sepals usually connate and commonly spurred or saccate at the base..... 69. IONOPSIS
- GG. Base of the lip neither spurred nor saccate nor with appendages.
- H. Pollinia 2.
- I. Clinandrium low, slightly excavated, margin entire and not hyaline.
- J. Column winged near the stigma..... 71. TRIZEUXIS
- JJ. Column wingless near the stigma..... 76. BRASSIA
- II. Clinandrium with a high margin enfolding the anther or nearly so, or the column with spreading wings near the stigma.
- J. Leaves articulated at the base.
- K. Base of the lip enfolding the column and shortly adnate to it at its base..... 72. TRICHOPILIA
- KK. Base of the lip not enfolding the column.
- L. Lip inserted on the column near the middle.. 75. ASPASIA
- LL. Lip not inserted on the column near the middle.
- M. Lateral sepals or all sepals and petals long-caudate; column not winged near the stigma..... 76. BRASSIA
- MM. Lateral sepals or all sepals and petals not caudate, or if so then column winged near the stigma.
- N. Base of the lip forming a shallow sac.... 73. MESOSPINIIDIUM
- NN. Base of the lip not forming a shallow sac.



- O. Column with a pair of narrow stelidia at the middle; lip usually unlobed, pandurate or retuse..... 79. LEOCHILUS
- OO. Column lacking narrow stelidia at the middle; lip various.
- P. Lip long-unguiculate; flowers small.. 80. SIGMATOSTALIX
- PP. Lip not long-unguiculate; flowers usually not small.
- Q. Lip erect and parallel or contiguous to the column at the base; calli on the lip usually 2, parallel and not joined; column usually not winged..... 74. ODONTOGLOSSUM
- QQ. Lip spreading (usually approaching a right angle) from the column; calli on the lip various but if 2 then usually joined; column usually winged at the apex.
- R. Lip usually relatively large and not sharply lobed, usually lacking calli except at the base; flowers white..... 77. MILTONIA
- RR. Lip usually relatively small and distinctly 3-lobed, usually provided with calli above the base (as well as often at the base); flowers commonly yellow to maroon..... 78. ONCIDIUM\*
- JJ. Leaves not articulated, i. e. marcescent; plants with densely equitant-leaved, elongated stems, without pseudobulbs..... 81. LOCKHARTIA
- HH. Pollinia 4; lip with a retrorse callus near the base..... 82. ORNITHOCEPHALUS
- FF. Anther erect on the back of the column or erect on the apex of the column under the clinandrium; rostellum erect or ascending.
- G. Column provided with stiff hairs..... 85. TELIPOGON
- GG. Column not provided with stiff hairs.
- H. Clinandrium margins small, not almost surrounding the anther..... 83. NOTYLIA
- HH. Clinandrium margins large, almost forming a calyptra over the anther..... 84. MACRADENIA
- AA. Subseries b. MONOPODIALES. Plants forming a monopodium, i.e. the stems having infinite apical growth.
- B. Column with an infrastigmatic ligule; stems with equitant leaves.... 86. DICHAEA
- BB. Column without an infrastigmatic ligule; stems not having equitant leaves, plants sometimes leafless..... 87. CAMPYLOCENTRUM

\* *Oncidium*, *Miltonia*, *Odontoglossum*, *Brassia*, *Aspasia*, *Leochilus* and *Mesospinidium* are only one genus, naturally, for they merge completely. However for purposes of convenience they are best left apart. The first three mentioned are all well known and, except for borderline species, even the amateur can soon learn to distinguish them easily by their aspect.



## 1. SELENIPEDIUM Reichb. f.

SELENIPEDIUM Reichb. f. *Xenia Orch.* 1:3, *t.* 2. 1854; emend. Pfitz. in Engl. *Pflanzenr.* IV. 50 (Heft 12): 27. 1903.

*Solenipedium* Beer, *Prakt. Stud. Orch.* 310. 1854.

Tall terrestrial herbs with leafy, often branched stems. Leaves narrow, many-nerved, inarticulate. Inflorescence terminal, racemose, many-flowered. Flowers small to medium-sized, resupinate. Sepals spreading, the dorsal free, the laterals connate nearly to their apices. Petals smaller than the sepals, free. Lip calceiform, saccate. Column short, terete. Fertile stamens 2, the third stamen (staminodium) sterile. Stigma wider than the staminodium, papillose, trisulcate. Capsule fusiform, trilocular, crowned by the marcescent perianth.

One species in Panama.

1. SELENIPEDIUM CHICA Reichb. f. *Xenia Orch.* 1:3, *t.* 2. 1854; Pfitz. in Engl. *Pflanzenr.* IV. 50 (Heft 12): 27. 1903; Ames, *Sched. Orch.* 2:1, *t.* 1. 1923.

Stems leafy, erect, slender, up to about 5 m. tall. Leaves when mature 15–30 cm. long and 1.5–5 cm. broad, elliptic-lanceolate to lanceolate, acuminate, submembranaceous, many-nerved, inarticulate, sparsely pubescent dorsally, especially along the nerves, or becoming glabrate, contracted at the base into a cylindrical sheath covering the stem. Inflorescence terminal, many-flowered, densely pubescent; flowers small to medium-sized, opening in succession, soon deciduous if not fertilized; bracts normally 10–15 mm. long, lanceolate, acute, puberulent. Dorsal sepal about 2 cm. long and 1 cm. broad, elliptic-oval, acute, puberulent dorsally toward the base. Lateral sepals together about 2 cm. long and 1 cm. broad, elliptic-oval, acute, connate nearly to their apices. Petals up to 2 cm. long and about 2 mm. broad, linear, puberulent dorsally along the mid-nerve and within near the base. Labellum 2–3 cm. long and 1–1.8 cm. broad in natural position, calceiform, margins strongly involute.

Endemic in Panama.

"PANAMA": without data, *Duchassaing*. PANAMÁ: in foothills 20 miles northeast of Panama City, alt. 60–90 m., *Powell 258*; northeast of Panama City, *Powell 3007*. CANAL ZONE: Ancon Hill, *Killip 3043*; Cañon of Río Chagres, alt. 70–80 m., *Steyermark & Allen 17506*.

This is undoubtedly the largest terrestrial orchid in the Americas.

## 2. PHRAGMIPEDIUM (Pfitz.) Rolfe

PHRAGMIPEDIUM (Pfitz.) Rolfe in *Orch. Rev.* 4:331. 1896; Pfitz. in Engl. *Pflanzenr.* IV. 50 (Heft 12): 42. 1903, as *Phragmopedilum*.

*Paphiopedilum* § *Phragmopedilum* Pfitz. in Engl. *Bot. Jahrb.* 25:527. 1898.





Fig. 64. *Selenipedium chica*



Terrestrial or epiphytic herbs with very short stems. Leaves duplicative, coriaceous, sulcate above and carinate below, inarticulate. Inflorescence terminal, racemose or paniculate, several-flowered; flowers medium to large-sized, resupinate. Sepals spreading, the dorsal free, the laterals connate almost to their apices. Petals narrower than the sepals but often much elongated and caudate. Lip calceiform, saccate. Column short. Fertile anthers 2, the third stamen (staminodium) sterile, stigma deflexed from the apex of the column, subparallel to the ovary or subrotund, papillose. Capsule long-fusiform, trilocular, the perianth deciduous.

Two species in Panama and about a dozen species in South America. Often in cultivation.

- a. Petals mostly more than 30 cm. long when mature; leaves lorate..... 1. *P. CAUDATUM*  
 aa. Petals mostly less than 10 cm. long when mature; leaves linear or linear-ligulate..... 2. *P. LONGIFOLIUM*

1. *PHRAGMIPEDIUM CAUDATUM* (Lindl.) Rolfe in Orch. Rev. 4:332. 1896; Pfitz. in Engl. Pflanzenr. IV. 50 (Heft 12): 52. 1903, in synonym; L. Wms. in Ann. Missouri Bot. Gard. 26:279. 1939.

*Cypripedium caudatum* Lindl. Gen. & Sp. Orch. Pl. 531. 1840.

*Cypripedium Humboldti* Warsz. ex Reichb. f. in Bot. Zeit. 10:691. 1852.

*Cypripedium Warszewiczianum* Reichb. f. loc. cit. 692. 1852.

*Paphiopedilum caudatum* Pfitz. in Engl. Bot. Jahrb. 19:41. 1894; Kerch. Orch. 454. 1894.

*Cypripedium caudatum* var. *Warszewiczii* Hort. in Kerch. loc. cit. 1894.

*Cypripedium caudatum* var. *roseum* Hort. in Kerch. loc. cit. 1894.

*Phragmopedilum Warszewiczianum* Schltr. in Fedde Rep. Sp. Nov. Beih. 17:9. 1922.

Stems very much reduced, leafy. Leaves 15–20 cm. long, 3–5 cm. broad, lorate, obtuse, apex shallowly and unequally bilobed, coriaceous, inarticulate, glabrous. Inflorescence terminal, few-flowered, exceeding the leaves; rachis velutinous; flowers large; bracts 3–6 cm. long, obtuse, subrotund, clasping the rachis. Dorsal sepal 10–15 cm. long and 1.5–2 cm. broad at the base, lanceolate, minutely pubescent dorsally. Lateral sepals together about 8–11 cm. long and 2.5–4 cm. broad, ovate-lanceolate to lanceolate, connate to their apices. Petals 30–70 cm. long when mature, 0.5–1 cm. broad at the base, long-caudate, puberulent. Lip 5–6 cm. long and about 2.5–3 cm. broad in natural position, calceiform, margins involute, lateral edges of the opening pilose. Ovary velutinous.

Panama, Venezuela (?), Colombia, Ecuador and Peru.

CHIRIQUÍ: probably Volcán de Chiriquí, *Warszewicz*; vicinity of Casita Alta, Volcán de Chiriquí, alt. 1500–2000 m., *Woodson, Allen & Seibert 962*.

The description is based on the specimens collected by Woodson, Allen and Seibert. No living material was available, and the plant is difficult to describe from dried material. The form of the species in Panama is the superior horticultural form and for this reason has been almost exterminated there. The species is difficult to grow at sea-level.

2. *PHRAGMIPEDIUM LONGIFOLIUM* (Warsz. & Reichb. f.) Rolfe in Orch. Rev. 4:33. 1896.



*Cypripedium longifolium* Warsz. & Reichb. f. in Bot. Zeit. 10:690. 1852; Hook. f. in Bot. Mag. 98: t. 5970. 1872.

*Selenipedium longifolium* Reichb. f. Xenia Orch. 1:3. 1854.

*Cypripedium Hincksianum* Reichb. f. in Gard. Chron. n. s. 9:202. 1878.

*Paphiopedilum longifolium* Pfitz. in Engl. & Prantl, Nat. Pflanzenfam. II. 6:84. 1888.

*Paphiopedilum longifolium* Kerch. Orch. 455. 1894.

*Paphiopedilum Hincksianum* Pfitz. in Engl. Bot. Jahrb. 19:41. 1894.

Stems much reduced, leafy. Leaves up to 80 cm. long and 1–4 cm. broad, linear or linear-ligulate, canaliculate, acute, inconspicuously and unequally bilobed at the apex, inarticulate, distichous. Inflorescence terminal, several-flowered, glabrous; flowers medium-sized; bracts 4–9 cm. long and 1–2 cm. broad, acute, distichous, glabrous. Dorsal sepal 3–5.5 cm. long and 1–1.8 cm. broad, lanceolate or lanceolate-acuminate. Lateral sepals 2.5–5 cm. long and 1.7–2.5 cm. broad, ovate-lanceolate. Petals 5–10 cm. long and 0.4–0.8 cm. broad, linear-lanceolate, caudate, pubescent within, especially at the base. Lip 2.5–4 cm. long and about half as broad, calceiform, pubescent within, at least at the base, margins involute.

Costa Rica, Panama and Colombia.

CHIRIQUÍ: in barranca west of Caldera River, alt. 3800 feet, *Powell 308*; without locality, *Warszewicz*. COCLÉ: valley of the upper Río Mata Ahogado, alt. 350 m., *Allen 145*; Las Margaritas, *Bouché 4*. PANAMÁ: without locality, *Seemann 1114*.

### 3. HABENARIA Willd.

HABENARIA Willd. Sp. Pl. 4:44. 1805; Kränzl. Orch. Gen. & Sp. 1:174. 1901; Ames, Orch. 4:1–288. 1910.

*Gymnadenia* R. Br. in Aiton, Hort. Kew. ed. 2, 5:191. 1813.

*Platanthera* L. C. Rich. in Mém. Mus. Par. 4:48. 1818.

*Limnorchis* Rydb. in Mem. N. Y. Bot. Gard. 1:104. 1900.

Terrestrial or palustrine herbs with cauline or basal leaves or rarely the leaves reduced to bracts. Leaves thin to fleshy, usually prominent. Inflorescence few- to many-flowered, spicate or racemose; flowers various; bracts often large and conspicuous. Sepals subequal, free or connate at the bases, the dorsal erect, usually concave, the laterals usually spreading. Petals similar to the sepals but usually smaller, or more or less deeply bifid (rarely trifid or polyfid). Lip simple or 3 or more-lobed, often adnate to the column, spreading or pendulous, spurred at the base. Column short, footless. Stigmas 2 or 1 stigma 2-lobed, often elongated into short or comparatively long processes. Anther erect, rarely more or less resupinate, persistent; pollinia (or pollen) granular, with short or sometimes long caudicles from the base.

A polymorphic genus of world-wide distribution, probably one of the oldest genera in the family. There are many more generic synonyms than those cited but the ones given are the essential ones for the Panama flora. A good account of the North American species known to 1910 will be found in Ames, *Orchidaceae*, Vol. 4.



- a. Petals entire or merely toothed; lip entire, toothed at the base or 3-lobed.
- b. Petals lanceolate..... 1. *H. ALATA*
- bb. Petals not lanceolate..... 3. *H. PETALODES*
- aa. Petals bifid; lip 3-lobed.
- b. Palustrine or aquatic plants..... 8. *H. REPENS*
- bb. Not palustrine nor aquatic plants.
- c. Sepals less than 5 mm. long (mostly 3 mm.)..... 7. *H. HEPTADACTYLA*
- cc. Sepals much more than 5 mm. long.
- d. Lateral lobes of the lip very much shorter than the mid-lobe; petals short..... 4. *H. AVICULA*
- dd. Lateral lobes of the lip about as long as the mid-lobe or longer; petals normal.
- e. Bracts of the inflorescence large and leaf-like; flowers mostly less than 5... 6. *H. PAUCIFLORA*
- ee. Bracts of the inflorescence not large and leaf-like; flowers mostly more than 5.
- f. Spur 40-50 mm. long; leaves ensiform to linear-lanceolate..... 5. *H. BICORNIS*
- ff. Spur 15-25 mm. long; leaves elliptic-oblong to ovate-lanceolate.. 2. *H. MONORRHIZA*

Fig. 65. *Habenaria alata*

1. *HABENARIA ALATA* Hook. Exot. Fl. 3:t. 169. 1827; Ames, Orch. 4:273. 1910; Bot. Mus. Leaflet. Harv. Univ. 3:20, fig. 1934.

Erect or ascending terrestrial herbs with leafy stems, 2-7 dm. tall. Leaves 6-14 cm. long and 0.8-2 cm. broad, linear-lanceolate to lanceolate, acute or acuminate, reduced to bracts below and above. Inflorescence subracemose, up to 2 dm. long, densely flowered; flowers pale green. Dorsal sepal 6-10 mm. long and 5-7 mm. broad, ovate to suborbicular, concave. Lateral sepals 7-10 mm. long and 3.5-4.5 mm. broad, lanceolate to triangular-lanceolate, acute or acuminate. Petals 5.5-10 mm. long and 2-2.5 mm. broad, lanceolate, acute or obtuse, auriculate at the base on the anterior margin. Lip 5.5-8 mm. long and about 2 mm. broad, linear-lanceolate to lanceolate, entire, auriculate or dentate on either side at the base; spur up to 13 mm. long, recurved, subclavate. Ovary prominently winged when mature.

Neotropical.

CANAL ZONE: Barro Colorado Island, *Kenoyer* 249; Ana Lago and Corozal, *Powell* 316, 317, 318, 321, 3403.

The Panamanian material is somewhat atypical.



- 2, *HABENARIA MONORRHIZA* (Sw.) Reichb. f. in Ber. Deut. Bot. Ges. 3:274. 1885.  
*Orchis monorrhiza* Sw. Nov. Gen. & Sp. Prodr. 118. 1788.

Erect, slender, terrestrial herbs up to about 12 dm. tall. Leaves 3–13 cm. long and 1.5–4 cm. broad, elliptic-oblong to lanceolate to ovate-lanceolate, acute or acuminate, margins chartaceous, reduced to bracts upward. Inflorescence a densely flowered raceme up to about 20 cm. long; flowers white. Dorsal sepal 5–8 mm. long and 4–5.5 mm. broad, ovate or suborbicular-ovate, obtuse, cucullate. Lateral sepals 4–8 mm. long and 3–4 mm. broad, ovate, oblique, obtuse. Petals 5–8 mm. long, bipartite, the lobes subequal; anterior lobe filiform; posterior lobe elliptic or elliptic-oblong, obtuse or acutish. Lip about 7–10 mm. long, trilobate; lateral lobes filiform, spreading; mid-lobe linear-ligulate; spur 15–25 mm. long, pendulous, slender. Ovary somewhat winged.

Guatemala to Panama, the West Indies and South America.

CHIRIQUÍ: Boquete, alt. 1150 m., *Terry & Terry 1641*. COCLÉ: hills south of El Valle de Antón, alt. 600–800 m., *Allen 2771*.

3. *HABENARIA PETALODES* Lindl. Gen. & Sp. Orch. Pl. 316. 1835.

*Habenaria petalodes* var. *micrantha* Reichb. f. Beitr. Orch. Centr.-Am. 5. 1866.

*Habenaria Warszewiczii* Schltr. in Anex. Mem. Inst. Butantan 1<sup>2</sup>:25. 1921.

Erect terrestrial herbs up to about 6 dm. tall. Leaves 4–17 cm. long and 1–5.5 cm. broad, lanceolate to elliptic or elliptic-oblong, acute or somewhat acuminate, crowded near the middle of the stem, reduced to bracts above. Inflorescence up to about 25 cm. long, strict, densely flowered; bracts up to 3 cm. long, lanceolate to lanceolate-ovate, acute or acuminate. Dorsal sepal 6–10 mm. long and 4–6 mm. broad, ovate to broadly ovate, obtuse, cucullate. Lateral sepals 7–10 mm. long and 3.5–5 mm. broad, semi-lunate or oblong-arcuate, obtuse. Petals 5–9 mm. long and 3.5–6.5 mm. broad, oblong to subquadrate to triangular-oblong and cuneate at the base, dilated toward the truncate, bi- or tridentate apex. Lip 7–12 mm. long and about 1 mm. broad, linear, acute or obtuse, sometimes dilated at the apex and sometimes with obscure teeth on either side at the base; spur up to 30 mm. long (mostly about 20 mm.), slender, straight.

Panama, Colombia, Brazil and Paraguay.

"PANAMA": *Warszewicz*. COCLÉ: Nata, alt. about 50 m., *Allen 820*. PANAMÁ: Taboga Island, *Killip 3173, 3190, 3191*; same locality, alt. 0–350 m., *Allen 1280*. CANAL ZONE and PANAMÁ: Chorerra, Tapia, Sieba Terra, Sosa Hill, Ancón Hill, Juan Diaz Range, *Powell 212, 260, 261, 262, 264, 265, 266, 326, 327, 328, 330, 331, 332, 336, 337, 339, 346, 3417, 3419, 3421*.

I have reported a specimen of this, in error, as *H. strictissima* var. *odontopetala* (Reichb. f.) L. Wms., in Ann. Missouri Bot. Gard. 27:271. 1940.

4. *HABENARIA AVICULA* Schltr. in Fedde Rep. Sp. Nov. Beih. 17:138. 1921.

*Habenaria patentiloba* Ames in Proc. Biol. Soc. Wash. 34:151. 1921.

Slender, erect, terrestrial herbs up to 4.5 dm. tall, with leafy stems. Leaves 7–15 cm. long and 1–3.5 cm. broad, lanceolate, elliptic to elliptic-oblong, obtuse,



acute or acuminate, reduced to bracts above and below. Inflorescence laxly to densely flowered; bracts 1–2.5 cm. long and 0.4–0.8 cm. broad, lanceolate to ovate-lanceolate, acute or acuminate. Dorsal sepal about 4–6 mm. long and as broad, suborbicular, concave. Lateral sepals 6–10 mm. long and 4–7.5 mm. broad, broadly sub-lunate, spreading. Petals 4–6 mm. long and about 3 mm. broad, bifurcate, the lobules or teeth acute, the anterior tooth shortest. Lip 12–16 mm. long and 1–2 mm. broad, linear, provided with a pair of narrow basal teeth about 1–3.5 mm. long; spur 15–30 mm. long, slightly recurved.

Endemic in Panama.

"PANAMA": *Joseph; Purdom*. PANAMÁ: Orange River Valley, *Killip 3124*. CANAL ZONE: near Fort Kobe, *Allen 2023*; hills near Summit, *Allen 2251*; foothill savannahs east of city, *Powell 162*.

5. *HABENARIA BICORNIS* Lindl. Gen. & Sp. Orch. Pl. 309. 1835.

Erect terrestrial herbs up to 6.5 dm. tall, with leafy stems. Leaves 5–25 cm. long and 0.5–1.5 cm. broad, ensiform to linear-lanceolate, acute or acuminate. Inflorescence a many-flowered raceme; bracts 1–3 cm. long, lanceolate, acuminate. Dorsal sepal 6–8 mm. long and 4–6 mm. broad, ovate-orbicular, cucullate, obtuse or acute, apiculate. Lateral sepals 8–10 mm. long and 4–5 mm. broad, semi-lunate, acute, apiculate. Petals bifid; posterior lobe 5–6 mm. long and 1.5–2 mm. broad, acute, arcuate; anterior lobe 6–9 mm. long and about 1 mm. broad, linear-filiform, acute, arcuate. Lip tripartite; the mid-lobe 7–10 mm. long and 1–2 mm. broad; lateral lobes 9–12 mm. long and 1–1.5 mm. broad, arcuate-spreading, acute; spur 40–50 mm. long, slender, subclavate.

Panama, the West Indies.

PANAMÁ: near Pacora, *Powell 315*. CANAL ZONE: Las Sabanas, *Pittier 6792*.

6. *HABENARIA PAUCIFLORA* (Lindl.) Reichb. f. in Bonplandia 2:10. 1854; L. Wms. in Ann. Missouri Bot. Gard. 26:280. 1939.

*Bonatea pauciflora* Lindl. Gen. & Sp. Orch. Pl. 329. 1835.

*Habenaria setifera* Lindl. in Ann. Nat. Hist. 4:381. 1840; Ames, Orch. 4:209, *t. 69*. 1910; in Bot. Mus. Leafl. Harv. Univ. 3:35, *fig. 1, p. 23*. 1934.

*Habenaria spathacea* Rich. & Gal. in Ann. Sci. Nat. III, 3:29. 1845.

Erect terrestrial herbs up to 5.5 dm. tall. Leaves 4–12 cm. long and 0.3–1.8 cm. broad, linear-lanceolate to elliptic-lanceolate, acute or acuminate, sometimes much reduced, usually partly sheathing the stem, reduced to bracts above. Inflorescence few-flowered (rarely more than 5-flowered); bracts similar to the leaves but smaller. Dorsal sepal 9–12 mm. long and 5–8 mm. broad, ovate-lanceolate to ovate, apiculate, cucullate. Lateral sepals 8–12 mm. long and 3.5–5 mm. broad, triangular-lanceolate, subfalcate, acute, acuminate or apiculate. Petals bipartite; anterior lobe 6–10 mm. long and up to 1 mm. broad, subfiliform, somewhat arcuate; posterior lobe 8–10 mm. long and 3–4 mm. broad, lanceolate or elliptic-lanceolate, acute, somewhat arcuate. Lip tripartite; the lateral lobes divergent and subequal to the mid-lobe in length; mid-lobe 10–14 mm. long and up to 2 mm. broad; spur 2.5–6 cm. long, subclavellate.



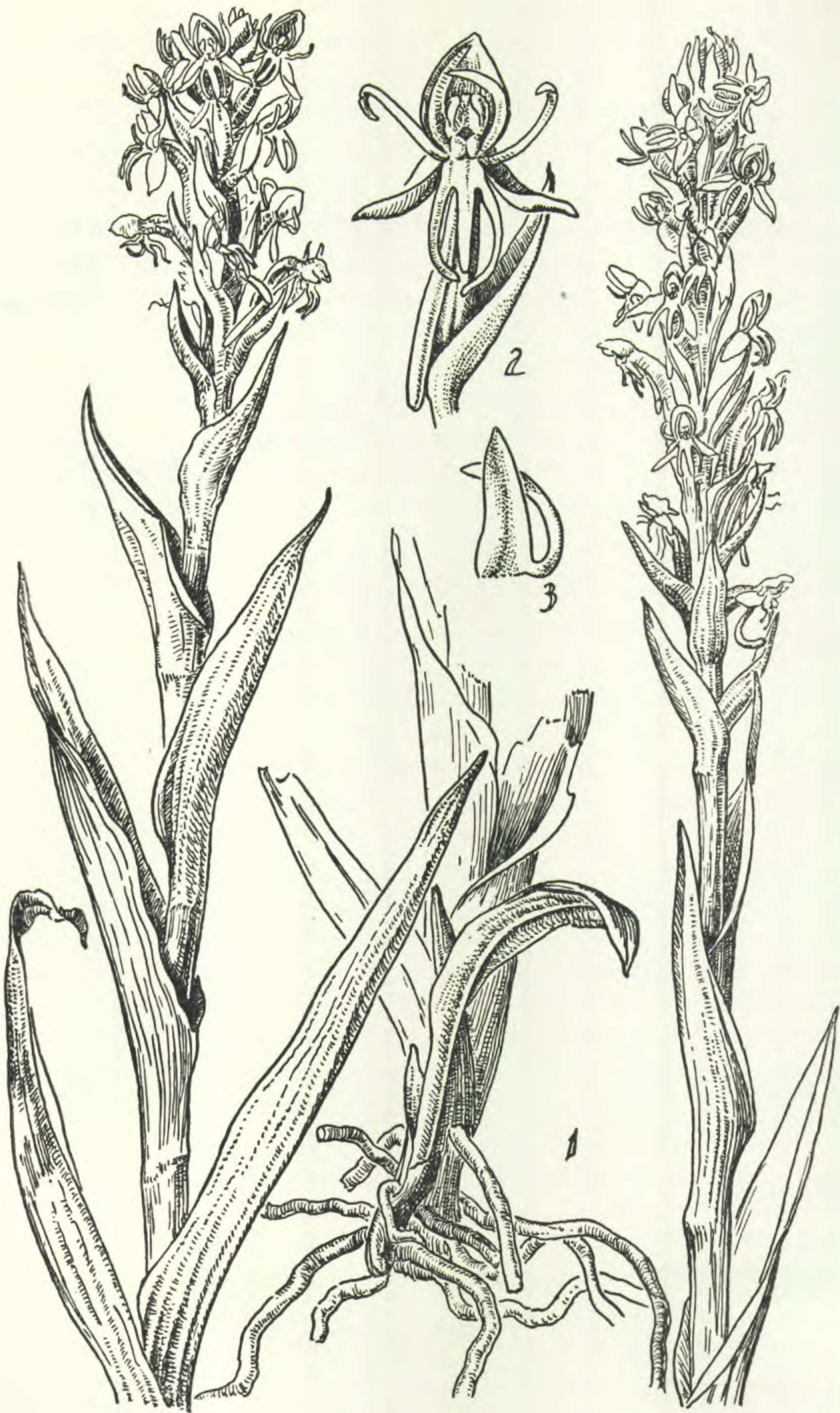


Fig. 66. *Habenaria repens*



Mexico to Argentina.

CHIRIQUÍ: Llanos del Volcán, *Seibert 326*. PANAMÁ: Campana to Chica, *Allen 2653*; Pacora to Chepo, *Woodson, Allen & Seibert 1665*.

An extremely variable species which has twenty or more synonyms.

7. *HABENARIA HEPTADACTYLA* Reichb. f. in *Linnaea* 22:812. 1849.

Slender, erect, terrestrial herbs up to 3.5 dm. tall. Leaves up to 7 cm. long, linear-filiform, aristate, reduced to bracts above. Inflorescence short, several-flowered, more or less secund; bracts up to 1.5 cm. long, ovate-lanceolate, long-acuminate; flowers small for the genus. Dorsal sepal 3–3.5 mm. long and 2–2.5 mm. broad, ovate, obtuse, cochleate, 3-nerved. Lateral sepals 3.5–4 mm. long and 1.2–1.5 mm. broad, lanceolate, acute, 3-nerved. Petals 2.5–3 mm. long, bipartite; the segments subequal or the outer shorter, lanceolate, acute, somewhat arcuate. Lip 3-lobed; the mid-lobe linear, 3–4.5 mm. long and about 0.5 mm. broad, linear, obtuse; lateral lobes 2.5–3.5 mm. long and 0.4–0.6 mm. broad, linear, obtuse, spreading; spur 10–12 mm. long, recurved, slightly saccate at the tip.

Panama, Colombia, Venezuela, British Guiana and Brazil.

WITHOUT LOCALITY: *Bouché 7*. PANAMÁ: near Arraiján, alt. about 15 m., *Woodson, Allen & Seibert 1406*.

8. *HABENARIA REPENS* Nutt. *Gen. N. Am. Pl.* 2:190. 1818; *Ames, Orch.* 4:216. 1910; in *Bot. Mus. Leafl. Harv. Univ.* 3:35, *fig. p. 23*. 1924.

Erect, slender, palustrine or aquatic herbs up to about 1 m. tall. Leaves up to 20 cm. long and 0.5–2.3 cm. broad, linear-elliptic to elliptic-lanceolate, acute or acuminate, reduced to bracts upward. Inflorescence a densely flowered raceme; flowers green. Dorsal sepals 4–7.5 mm. long and 3–5 mm. broad, oval to sub-orbicular-ovate, cochleate, apiculate. Lateral sepals 4–8 mm. long and 2–3 mm. broad, ovate to lanceolate-oval, oblique, apiculate. Petals 4–9 mm. long, bipartite, the lobes subequal; anterior lobe filiform; posterior lobe 1–2 mm. broad, linear-lanceolate to lanceolate, arcuate. Lip 5–10 mm. long and 1–2.5 mm. broad across the base, trilobate, the lobes subparallel; lateral lobes filiform; mid-lobe linear-lanceolate, usually a little shorter than the laterals; spur 8–15 mm. long, slender.

Southeastern United States, Guatemala, British Honduras, Nicaragua, Costa Rica, Panama, the West Indies and South America.

CANAL ZONE: Barro Colorado Island, *Bailey & Bailey 663*; *Dodge 3483*; *Woodworth & Vestal 55A, 65A*.

Often found in floating debris and in very wet places. The illustration, *fig. 66*, is redrawn from *Ames, Orch.* 1:51, *t. 16*. 1905.



## 4. POGONIA Juss.

POGONIA Juss. Gen. 65. 1789.

*Triphora* Nutt. Gen. N. Am. Pl. 2:192. 1818.

*Cleistes* L. C. Rich. in Mém. Mus. Par. 4:31. 1818.

Rhizome or tuber-bearing, leafy or leafless terrestrial herbs. Sepals subequal, free, erect or rarely spreading. Petals similar to the sepals or shorter and broader, usually erect. Lip erect, simple or 3-lobed, sessile or unguiculate, plane or with various lamellate or thickened nerves, spurless. Column elongated, wingless, footless; stigma oblong or broader; clinandrium more or less raised, entire or denticulate; anther subincumbent or apparently erect, substipitate (at least in some species); pollinia 2 masses, granular.

Ames (Orch. 7:7. 1922), in his account of this group of allied genera, separates *Cleistes* (*Pogonia rosea*) from *Pogonia* (typified by *P. ophioglossoides*) on the basis of simple pollen grains for *Pogonia* and compound pollen grains for *Cleistes*. However the so-called *Cleistes* seem to have simple pollen grains as often as not. The case for maintaining *Triphora* as a distinct genus is much better and is based on better characters. It is a matter of choice whether or not it is maintained.

- a. Lip with two stipitate processes at the base; lamina simple..... 1. P. ROSEA
- aa. Lip without stipitate processes at the base; lamina 3-lobed.
  - b. Apex of the lip, at least, verrucose..... 4. P. CUBENSIS
  - bb. Apex of the lip, nor any part, verrucose.
    - c. Cauline leaves well developed..... 2. P. MEXICANA
    - cc. Cauline leaves none or very much reduced..... 3. P. WAGNERI

1. POGONIA ROSEA (Lindl.) Hemsl. in Godm. & Salvin, Biol. Centr.-Am. Bot. 3:304. 1884.

*Cleistes rosea* Lindl. Gen. & Sp. Orch. Pl. 410. 1840.

Tall, slender, erect, terrestrial herbs up to 1.5 m. tall (Panamanian material up to 0.7 m. tall). Leaves 3–12 cm. long, 0.8–2.5 cm. broad, lanceolate, obtuse or acute, sessile and clasping the stem, apparently rather thick when fresh. Inflorescence of 1 or 2 rather large and showy flowers in the axils of the upper leaves. Dorsal sepal 5–6.5 cm. long and 0.6–0.8 cm. broad, linear-elliptic to lanceolate-elliptic, acute. Lateral sepals 5.5–6.5 cm. long and 0.8–1.1 cm. broad, linear-lanceolate to lanceolate, acute. Petals 5–6.5 cm. long and 1–1.6 cm. broad, elliptic to elliptic-oval, acuminate. Lip 4.5–5.5 cm. long and 1.6–3 cm. broad, broadly oblanceolate to narrowly obovate, obtuse, the median line of the lip callus-thickened or lamellate, lacerate toward the apex, with two stipitate processes at the base.

Panama, Colombia, Venezuela, British Guiana, possibly also in Costa Rica, and doubtless in other of the South American countries,—the “West Indies” according to Hemsley.

COCLÉ: *Seibert* 594. CANAL ZONE: *Powell* 113, 3395, 3400. “Panama,” *Duchassaing*.



Fig. 67. *Pogonia rosea*



Mr. Powell reported a white-flowered form of the species.

2. *POGONIA MEXICANA* S. Wats. in Proc. Am. Acad. 26:154. 1891.

*Triphora mexicana* Schltr. in Fedde Rep. Spec. Nov. Beih. 17:139. 1921; Ames, Orch. 7:40, t. 109, f. 5-6. 1922.

Weak terrestrial herbs up to 27 cm. tall, with leaf-bearing stems. Leaves 8-20 mm. long and 5-17 mm. broad, narrowly to broadly ovate, obtuse or acute. Inflorescence of 1-3 single flowers borne in the axils of the upper leaves (or leaf-like bracts?). Dorsal sepals 10-17 mm. long and about 2 mm. broad, linear to linear-oblongate, obtuse or acute. Lateral sepals 10-17 mm. long and 1.5-3 mm. broad, linear to narrowly elliptic, subfalcate, acute. Petals 9-17 mm. long and 1-3 mm. broad, linear to linear-elliptic, subfalcate, acute or obtuse. Lip 10-16 mm. long and 5-9 mm. broad, narrowly oval to obovate in outline, conspicuously narrowed to the base, 3-lobed; lateral lobes obtuse, subtriangular, terminal lobe suborbicular to deltoid; disc trilamellate.

Mexico, Guatemala and Panama.

CANAL ZONE: *Bevins*.

Very close if not the same as *Pogonia trianthophora* (Sw.) BSP.

3. *POGONIA Wagneri* (Schltr.) L. Wms., comb. nov.

*Triphora Wagneri* Schltr. in Fedde Rep. Sp. Nov. 17:139. 1921.

Small, leafless, erect, terrestrial herbs up to 7.5 cm. tall. Inflorescence 1-flowered, the flower erect. Dorsal sepal about 12 mm. long, ligulate, obtuse. Lateral sepals about 12 mm. long, ligulate, obtuse, falcate. Petals a little shorter and a little broader than the dorsal sepal, ligulate, obtuse, subfalcate-oblique. Lip about 10 mm. long and 5 mm. broad, narrowly obovate-cuneate in outline, prominently 3-lobed near the apex; lateral lobes obliquely ovate, obtuse; mid-lobe semi-ovate, obtuse, somewhat undulate; disc with 3 thickened, subverrucose nerves toward the apex.

Known only from Panama.

CHIRIQUÍ and VERAGUAS: *Wagner 1778*.

The description is taken from the original and a manuscript analysis.

4. *POGONIA CUBENSIS* Reichb. f. in Nederl. Kruidk. Arch. 4:322. 1850, as *P. rubensis* by error.

*Triphora cubensis* Ames, Sched. Orch. 7:35. 1924.

Small terrestrial herbs up to 15 cm. tall. Leaves few, reduced to sheathing bracts, often much reduced above, 0.8-2 cm. long and 0.4-1 cm. broad, lanceolate to suborbicular. Inflorescence several-flowered, the pedicels of the lower flowers often elongated and hence the raceme often appearing subcorymbose. Dorsal sepal 7-8 mm. long and 1-1.5 mm. broad, linear to linear-lanceolate, obtuse. Lateral sepals similar to the dorsal sepal except more or less arcuate. Petals 7-7.5



mm. long and 1–1.2 mm. broad, narrowly elliptic to narrowly elliptic-oblongate, acute or obtuse. Lip 7–8 mm. long and about 3 mm. broad, lanceolate-obovate, unguiculate, 3-lobed, mid-nerve more or less lamellate and often dentate; mid-lobe subrotund; lateral lobes usually short, lanceolate to lanceolate-ovate.

Florida, Mexico, Panama and Cuba.

CANAL ZONE: Barro Colorado Island, *Kenoyer 250*.

This species has the appearance of a saprophyte but probably is not. It has been collected but once in Panama.

### 5. VANILLA Sw.

VANILLA SW. in *Nova Acta Soc. Sci. Upsal.* 6:66. 1799; Rolfe in *Jour. Linn. Soc. Bot.* 32:439–478. 1896.

Usually epiphytic, scandent, leafy (in Panama) or leafless herbs, often with branched stems. Leaves coriaceous or fleshy, sessile or short-petiolate. Inflorescence a (short) raceme from the axils of the leaves. Sepals subequal, spreading, free. Petals similar to the sepals. Lip with its claw adnate to the column, often enfolding the column. Column elongated, footless, wingless; anther incumbent (rarely appearing erect); pollinia granular. Capsule ("bean") elongated, fleshy, often fragrant.

The only truly commercial members of the Orchidaceae belong to the genus *Vanilla*. The extract of the *Vanilla* "bean" was perhaps the first flavoring used by the American Indians. Natural *Vanilla* flavoring is now largely displaced by the synthetic.

The taxonomy of *Vanilla* is most difficult because of the fugaceous flowers.

- a. Lip with verrucose lines or papillae..... 1. *V. PLANIFOLIA*  
 aa. Lip without verrucose lines or papillae..... 2. *V. POMPONA*

1. *VANILLA PLANIFOLIA* Andr. *Bot. Repos.* 8: *t.* 538. 1808; Dillon in *Am. Orch. Soc. Bull.* 10:339, *t.* II. 1942.

*Vanilla fragrans* of authors.

Scandent branched leafy herbs. Leaves 8–23 cm. long and 2–8 cm. broad, narrowly lanceolate to elliptic-oblong, acute or acuminate, fleshy. Raceme short, 5–7 cm. long, axillary; bracts 5–10 mm. long, oblong, obtuse or subacute. Sepals 4–7 cm. long and 1–1.5 cm. broad, linear to oblanceolate, obtuse or acute. Petals similar to the sepals but smaller. Lip 4–5 cm. long and 1.5–3 cm. broad, with longitudinal, verrucose lines or papillae and a tuft of pubescence on the disc. Column about 3 cm. long, pubescent dorsally. Capsule ("bean") up to about 20 cm. long and 1 cm. in diameter.

Mexico to Panama, probably also in the West Indies. Cultivated throughout the tropics of the world.

SAN BLAS: Perme, *Cooper 287*. CANAL ZONE: Fort Clayton and Corozal, *Standley 29103*. PANAMÁ: Río Tecúmen, *Standley 29353*; near Panamá, *Standley 29731*.



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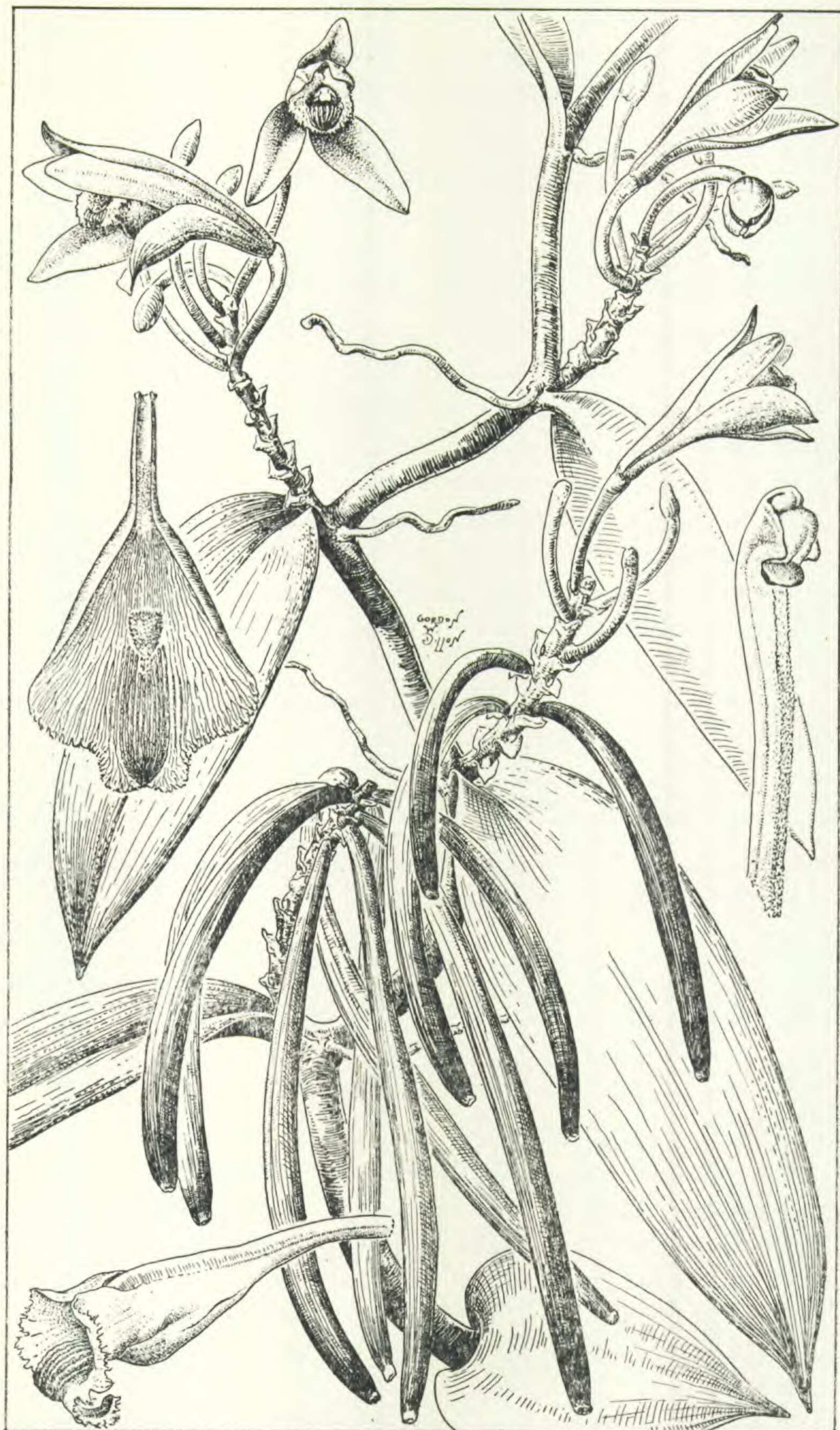


Fig. 68. *Vanilla planifolia*

(127)





We think that *Vanilla rubra* (Lam.) Urban will probably prove to be the correct name for this species.

This is the most commonly cultivated of the Vanillas. There are apparently several forms of the species and considerable difference in the flavor of the Vanilla extract in the various forms.

2. VANILLA POMPONA Scheide in *Linnaea* 4:573. 1829; Ames, *Sched. Orch.* 9:6. 1925.

*Vanilla Pompona* Lindl. *Gen. & Sp. Orch. Pl.* 437. 1840.

*Vanilla Pittieri* Schltr. in *Fedde Rep. Sp. Nov.* 3:106. 1906.

Scandent, branched, leafy herbs. Leaves 10–30 cm. long and 3.5–9 cm. broad, variable in shape, narrowly elliptic-oblong or elliptic-lanceolate to lanceolate-ovate, rarely obovate-lanceolate, often oblique, acute or obtuse, coriaceous. Inflorescence up to about 16 cm. long, several-flowered, axillary; bracts about 1 cm. long, lanceolate to ovate, obtuse or acute, cucullate. Sepals 7–8.5 cm. long, linear-elliptic to narrowly oblanceolate, obtuse or acute. Petals similar to the sepals or a little smaller. Lip 7–8.5 cm. long and 2.5–4 cm. broad, obovate-lanceolate to obovate, unguiculate, crenulate at least toward the apex, with a tuft of hair in the center of the disc. Column up to about 6 cm. long. Capsule ("bean") about 15 cm. long, fusiform.

Mexico to Panama, the West Indies, Venezuela, Ecuador, Bolivia, British and Dutch Guiana; possibly as a cultigen in some of these countries and possibly elsewhere.

CANAL ZONE: *Hunter & Allen* 852; *Maxon* 6779; *Powell* 127, 412, 3507; *Piper*.

*Vanilla Pompona* is cultivated in some places. It is probably inferior to *V. planifolia* for making extract of Vanilla.

#### 6. ELLEANTHUS Presl

ELLEANTHUS Presl, *Rel. Haenk.* 1:97. 1827; Benth. & Hook. *Gen. Pl.* 3:522. 1883.

*Evelyna* Poepp. & Endl. *Nov. Gen. & Sp. Pl.* 1:32. 1835.

Terrestrial or epiphytic herbs ordinarily with strongly nerved, plicate, cauline leaves. Sepals subequal, free or the laterals somewhat connate at the base and forming a mentum. Petals subequal to the sepals, usually narrower. Lip adnate to the base of the column and usually enfolding it, subequal to or exceeding the sepals, usually gibbous-concave at the base and constricted above the base, the basal cavity containing two large, usually subovoid calluses. Column erect, footless; anther operculate, more or less incumbent or erect, bilocular; pollinia 8, subceraceous.

A rather natural genus which is highly developed in the Andes.

a. Inflorescence distichous.

b. Stems fasciculately branched..... 4. E. AURANTIACUS

bb. Stems not fasciculately branched.



- c. Leaves 1.5 cm. or less long, oblong-lanceolate or broader, persistent..... 7. *E. MUSCICOLA*
- cc. Leaves 1.5 cm. or more long, elliptic-lanceolate or narrower, deciduous.
  - d. Bracts of the inflorescence imbricated; leaves subfiliform to linear..... 6. *E. LINIFOLIUS*
  - dd. Bracts of the inflorescence not imbricated; leaves elliptic-lanceolate..... 5. *E. LAXUS*
- aa. Inflorescence not distichous.
  - b. Stems fasciculately branched..... 4. *E. AURANTIACUS*
  - bb. Stems not fasciculately branched.
    - c. Inflorescence capitate or subcapitate..... 1. *E. CAPITATUS*
    - cc. Inflorescence spicate or racemose.
      - d. Lip trilobulate..... 3. *E. TRILOBATUS*
      - dd. Lip not trilobulate..... 2. *E. HYMENOPHORUS*

1. *ELLEANTHUS CAPITATUS* (P. & E.) Reichb. f. in Walp. Ann. 6:475. 1862.

*Evelyna capitata* Poepp. & Endl. Nov. Gen. & Sp. Pl. 1:32. 1835.

*Bletia capitata* R. Br. in Ait. Hort. Kew. ed. 2, 5:206. 1813, *but not basis of Elleanthus capitatus*.

Epiphytic or terrestrial, reed-like herbs up to about 12 dm. tall. Stems slender, erect, covered with leaf-sheaths or naked below. Leaves 5–25 cm. long (mostly 15–20 cm.) and 1–5.5 cm. broad, linear-lanceolate to ovate-lanceolate, acuminate, plicate, reduced upward and becoming bract-like. Inflorescence a dense, many-flowered, capitate or subcapitate raceme; outer bracts sterile, triangular-ovate, acuminate, up to about 4 cm. long, inner bracts fertile, ovate-lanceolate, acute or acuminate, shorter than the outer bracts; flowers covered with a glutinous material. Dorsal sepal 8–12 mm. long and 2.5–4 mm. broad, oblong-lanceolate, acute, slightly cucullate. Lateral sepals 8–12 mm. long and 3–4 mm. broad, elliptic-oblong, acute, somewhat oblique. Petals 11–12 mm. long and 1–2 mm. broad, linear, obtuse or acute. Lip 8–13 mm. long and 8–11 mm. broad, oval to sub-orbicular-flabellate, anterior margins more or less lacerate-dentate, base gibbous and with two approximate, subglobose calluses; disc thickened in the middle.

Mexico to Panama, the West Indies and in South America to Peru.

CHIRIQUÍ: Monte Lirio, alt. 1300–1900 m., *Seibert 140, 268*.

A distinctive and widespread species. The name is based on *Evelyna capitata* Poepp. & Endl., and not on *Bletia capitata* R. Br., although the two names apparently represent the same species.

2. *ELLEANTHUS HYMENOPHORUS* Reichb. f. in Walp. Ann. 6:480. 1862.

*Evelyna hymenophora* Reichb. f. in Bot. Zeit. 10:710. 1852.

Caespitose, epiphytic herbs up to about 6.5 dm. tall (usually much less). Stems slender, covered with leaf-sheaths. Leaves 4–17 cm. long and 1.8–8 cm. broad, elliptic, elliptic-ovate, ovate or oval, acuminate, pergameneous. Inflorescence a compact many-flowered spike up to about 9 cm. long; bracts up to about 1.5 cm. long, lanceolate-ovate or ovate, acuminate. Dorsal sepal 5.5–7 mm. long and about 2.5 mm. broad, lanceolate to oval, acute. Lateral sepals 5–7 mm. long and 2–3 mm. broad, lanceolate to oblong-lanceolate, acute, strongly keeled dorsally.



Petals 3.5–7 mm. long and 1–1.5 mm. broad, linear-spatulate to spatulate, obtuse or acutish, more or less crenulate above. Lip 7–9 mm. long and 6.5–9 mm. broad, broadly ovate to orbicular, lacerate-dentate, the gibbous-saccate base enclosing 2 ovoid calluses and the sac with a bidentate lamellate callus in front.

Costa Rica, Panama, Colombia and Peru.

CHIRIQUÍ: "Chiriquí," *Warscewicz*. COCLÉ: summit of Valle Chiquita, alt. 1360 m., *Bouché 3X*; hills north of El Valle de Antón, alt. 1000 m., *Allen 2172*; near Cerro Turega, alt. 650–700 m., *Woodson & Schery 168*. PANAMÁ: hills above Campana, alt. 600–800 m., *Allen 1883*.

3. *ELLEANTHUS TRILOBATUS* Ames & Schweinf. Sched. Orch. 8:53. 1925.

Slender epiphytic herbs up to about 8 dm. tall. Leaves 5–18 cm. long and 0.5–2.5 cm. broad, linear-lanceolate to lanceolate, acuminate, plicate, apex trilobulate, reduced upwards, basal part of the stem in mature plants naked. Inflorescence up to 8 cm. long, many-flowered; bracts up to 2.5 cm. long, ovate-lanceolate to ovate, acuminate, cucullate, chartaceous, reduced upward. Sepals more or less pubescent dorsally. Dorsal sepal 6–8 mm. long and 2–3.5 mm. broad, oblong-lanceolate to narrowly ovate-lanceolate, acute, apiculate. Lateral sepals 6–8 mm. long and 2.5–3 mm. broad, ovate-lanceolate to oblong-lanceolate, somewhat oblique, acute, cucullate. Petals 5–7 mm. long and 1–1.5 mm. broad, linear-oblong, obtuse. Lip trilobulate, 6–7.5 mm. broad, obovate-orbicular, flabellate, fimbriate-lacerate on the terminal half, base gibbous-saccate and with 2 oval calluses, disc with 2 transverse, sublamellate calluses about opposite each sinus. Ovary puberulent.

Costa Rica, Panama and Colombia.

COLÓN: near Porto Bello, *Maxon 5808*. PANAMÁ: vicinity of Campana, alt. about 1000 m., *Allen 2405*; hills east of [Panama] City or San Juan, *Powell 97, 3266, 3267, 3268, 3273, 3529*. CANAL ZONE: Barro Colorado Island, *Shattuck 201*.

The Powell specimens, regardless of numbers, are probably all from one collection. Schlechter has determined *Maxon 5808* and *Powell 97* as his *Elleanthus Brenesii* and says of the latter collection (Fedde, Rep. Sp. Nov. Beih. 17:13. 1922): "Die Pflanze stimmt recht gut mit meinem Originalexemplar aus Costa Rica überein." The description and analysis of *E. Brenesii* are not entirely satisfactory but when the type can be studied *E. trilobatus* will probably prove to be a synonym.

4. *ELLEANTHUS AURANTIACUS* (Lindl.) Reichb. f. in Walp. Ann. 6:482. 1863.

*Evelyna aurantiaca* Lindl. in Benth. Pl. Hartw. 149. 1844.

*Elleanthus Tonduzii* Schltr. in Fedde Rep. Sp. Nov. 8:567. 1910.

Erect or ascending, branched or usually fasciculately branched herbs up to about 1 m. or more tall. Stems slender, covered with sheaths but becoming naked below, the lateral stems usually smaller than the main stem. Leaves 2–12 cm. long and 0.2–1.4 cm. broad, linear-lanceolate to lanceolate, acuminate, apex 2–3-lobulate and short-aristate, plicate. Inflorescence up to about 4 cm. long, bilateral;



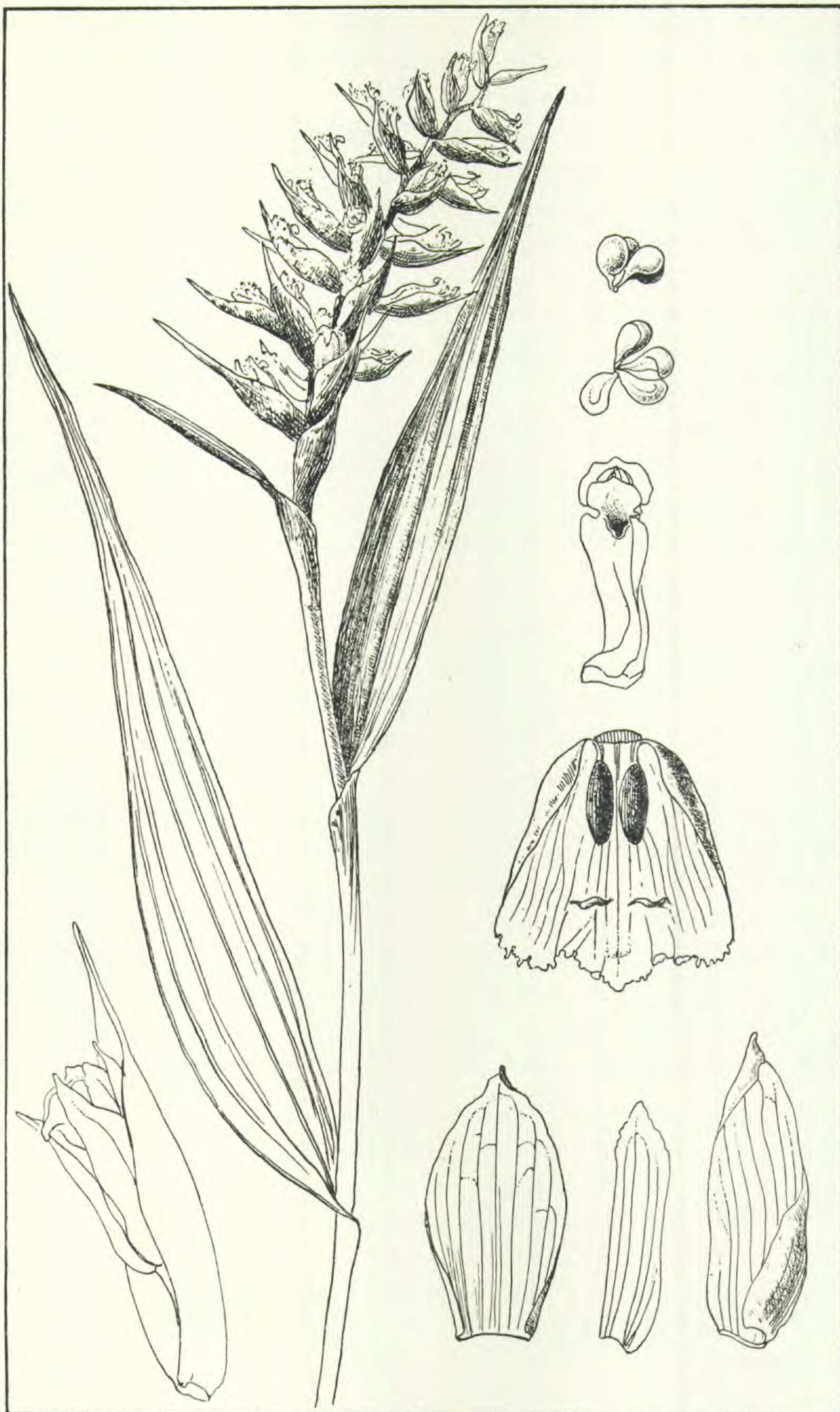


Fig. 69. *Elleanthus trilobatus*



bracts up to about 1.5 cm. long, ovate-lanceolate or ovate, acuminate, cucullate, scarious; rachis somewhat fractiflex. Sepals often puberulous dorsally. Dorsal sepal 4.5–7 mm. long and 2–3.5 mm. broad, lanceolate to ovate-lanceolate, acute, cucullate. Lateral sepals 6–8 mm. long and 3–4 mm. broad, lanceolate to lanceolate-triangular, acute, somewhat arcuate. Petals 5–8 mm. long and 2–2.5 mm. broad, linear-oblong or oblanceolate, obtuse or acute, often somewhat undulate. Lip 7–10 mm. long and 7–9 mm. broad, obovate-flabellate to suborbicular, lacerate-dentate at least toward the apex, saccate-gibbous at the base and with 2 approximate calluses.

Costa Rica, Panama, and in South America to Peru.

CHIRIQUÍ: Bajo Chorro, alt. 2100 m., *Davidson 123*. PANAMÁ: hills above Campana, July 1, 1939, *Allen 1884*.

*Elleanthus aurantiacus* is a widespread species with a distinctive mode of branching. The description is based on the Central American material and typical material from South America. Some specimens from South America are much more robust and have larger leaves than typical.

5. ELLEANTHUS LAXUS Schltr. in Fedde Rep. Sp. Nov. 12:213. 1913; in Fedde Rep. Sp. Nov. Beih. 59: t. 4, fig. 16. 1931.

Slender erect caespitose herbs up to about 4 dm. tall. Leaves 4–12 cm. long and 0.4–1.2 cm. broad, elliptic-lanceolate, acuminate, 2–3-dentate at the apex, plicate, mostly near the summit of the stems. Inflorescence up to 5 cm. long, few–several-flowered, distichous, strongly fractiflex; bracts up to 4.5 cm. long, reduced upward, lanceolate to ovate-lanceolate, acuminate, chartaceous, strongly cucullate, longer than the flowers. Sepals ligulate, acuminate, 7 mm. long, the laterals oblique. Petals oblique, linear, subacute, about equal to the sepals. Lip concave-subcucullate at the base, dilated above and deeply emarginate, the margins crenate-incised and undulate, 6 mm. long and 4 mm. broad above the middle, base with 2 oblong calluses, the disc with a few papillae.

Costa Rica (?) and Panama.

DARIÉN: Sambú Basin, alt. 500–974 m., *Pittier 5640*.

The description of the flowers is taken from the original publication. No flowers from typical material have been seen but there is an analysis (by Schlechter) in the Ames Herbarium. If the analysis is correct the Costa Rican material, of which flowers are available, belongs to a different species. The Costa Rican material called *E. laxus* has a lip which is essentially oblong, emarginate, lacks surface papillae of any sort (certainly lacks the tooth-like "papillae" of Schlechter's analysis and the figure cited); the petals are differently shaped as are the lateral sepals.

6. ELLEANTHUS LINIFOLIUS Presl, Rel. Haenk. 1:97. 1827.

*Isochilus linifolium* Lindl. Gen. & Sp. Orch. Pl. 113. 1831.

Densely caespitose epiphytic herbs up to about 3.5 dm. tall, but mostly up to



about 1.5 dm. tall in Panama. Stems slender, covered with the leaf-sheaths or partially naked. Leaves 1.5–9 cm. long and 0.1–0.4 cm. broad, subfiliform to linear, acute, obtuse or denticulate at the apex. Inflorescence up to 2.5 cm. long, a short, distichous, obscurely fractiflex raceme; bracts up to about 1.5 cm. long, lanceolate or ovate-lanceolate, acute or acuminate, cucullate, scarious, imbricated. Sepals glabrous or sparsely brown-pubescent dorsally. Dorsal sepal about 3 mm. long and 1 mm. broad, elliptic-lanceolate, cucullate. Lateral sepals 3–3.5 mm. long and 1.2–1.5 mm. broad, ovate-lanceolate, short-acuminate, somewhat arcuate. Petals about 3 mm. long and 1–1.2 mm. broad, linear-oblong to oblong-spatulate, obtuse, truncate, obscurely crenulate, arcuate. Lip about 3–3.5 mm. long and 4–5 mm. broad, subquadrate-flabellate to flabellate, truncate, denticulate, gibbous at the base and with 2 lightly attached ovoid calluses, with a short transverse callus above the base.

Mexico, British Honduras, Guatemala, Costa Rica, Panama, the West Indies and south to Peru.

COLÓN: Cativa-Porto Bello trail, *Powell 353*. COCLÉ: El Valle de Antón, alt. 600 m., *Allen 2075*; hills north of El Valle de Antón, alt. 1000 m., *Allen 2869*. CANAL ZONE: Gatún Lake, *Purdom*.

7. *ELLEANTHUS MUSCICOLA* Schltr. in Fedde Rep. Sp. Nov. Beih. 19:10. 1923.

Small caespitose epiphytic herbs up to about 12 cm. tall. Stems slender, covered with leaf-sheaths. Leaves 10–15 mm. long and 2.5–5 mm. broad, oblong-lanceolate to oblong-ovate, obtuse, coriaceous, persistent, distichous. Inflorescence up to about 1.7 cm. long, a short distichous, obscurely fractiflex raceme; bracts up to about 1 cm. long, lanceolate-ovate or ovate, compressed, cucullate, scarious, sphacelate, imbricated. Sepals substellate-furfuraceous dorsally; dorsal sepal about 3 mm. long and 1 mm. broad, elliptic, acute, cucullate; lateral sepals about 3 mm. long and 1.5 mm. broad, ovate-lanceolate, acuminate, cucullate. Petals about 3.5 mm. long and 1.5 mm. broad, oblanceolate-subflabellate, obtuse, crenulate-undulate above. Lip about 3–3.5 mm. long and 3.5–4 mm. broad, flabellate-triangular, truncate and denticulate.

Costa Rica and Panama.

COCLÉ: hills north of El Valle de Antón, alt. 1000 m., *Allen 2159*.

*Elleanthus muscicola* is unusual in the genus because of the habit and small persistent leaves.

7. *SOBRALIA* Ruiz & Pavon

*SOBRALIA* Ruiz & Pavon, Fl. Peruv. & Chil. Prodr. 120, t. 26. 1794.

*Fregea* Reichb. f. in Bot. Zeit. 10:712. 1852.

*Lindsayella* Ames & Schweinf. in Bot. Mus. Leafl. Harv. Univ. 5:33. 1935.

Large or small, reed-like, terrestrial or epiphytic herbs. Leaves pergameneous, plicate-veined, sessile, usually few. Inflorescence a terminal raceme or often reduced to 1 flower; flowers fugaceous in Panamanian species. Sepals equal or nearly so, erect or somewhat spreading, connate at their bases. Petals similar to the sepals



but usually broader. Lip erect, from the base of the column, usually covering or enfolding the column, simple, retuse or 3-lobed, usually concave, a little longer than the sepals and petals, often undulate or fimbriate; the disc smooth, lamellate or lamellate-cristate, usually with inconspicuous or conspicuous callus thickenings at the base. Column elongated, semi-terete, more or less arcuate, with narrow wings (auricles) or acute angles at the apex, footless; anther incumbent; pollinia 8, granular or subceraceous.

A small tropical American genus, possibly with its center of distribution in Panama. Difficult to work because of the fugaceous flowers.

*Fregea*, a genus described by Reichenbach, has been maintained as distinct but has no characters which will separate it from *Sobralia*.—The original specimen was collected in Chiriquí.

*Lindsayella*, a genus based on specimens from Panama, seems to have no characters of generic value. The main segregation character is the callus at the base of the lip. Rather than a generic character these calluses seem to be the culmination of a tendency within the genus *Sobralia*.

Our knowledge of this genus in Panama is entirely inadequate. A large number of the species presumed to grow there were described by Reichenbach from material collected by Warscewicz, and of many of them nothing further is known. Paul H. Allen, long a resident of Panama and the keenest collector of orchids who has been in the country, is inclined to believe that many of the Warscewicz *Sobralias* which were ascribed to Panama were actually collected elsewhere. Mr. Allen writes that when *Sobralias* are present in the Panama flora they are apt to be quite abundant; yet he has not been able to discover many of the species that Warscewicz is said to have collected in Chiriquí Province although he has collected the same area many times.

We have not been able to make a satisfactory key to this genus because many of the species are practically unknown and require more study, as a whole, than is possible now.

1. *SOBRALIA ALLENII* L. Wms. in Ann. Missouri Bot. Gard. 29:336, pl. 30, figs. 1-3. 1942.

Caespitose, epiphytic plants up to about 5 dm. tall. Stems about 1-2 mm. in diameter, slender, bearing 1-3 leaves toward the apex, leafless below or the leaves reduced to sheaths. Leaves 13-18.5 cm. long and 1.8-2.5 cm. broad, elliptic-lanceolate to narrowly elliptic, acuminate, plicate, with seven principal nerves, lepidote on the lower surface especially along the nerves at the base, glabrous above or essentially so; leaf-sheaths closely appressed to the stem, lepidote. Inflorescence terminal, 1-flowered; flowers small, white with a pale yellow lip. Dorsal sepal about 3.5 cm. long and 7 mm. broad, oblanceolate, apiculate, 7-nerved. Lateral sepals about 3.5 cm. long and 7 mm. broad, linear-oblong, apiculate, 7-nerved. Petals about 3.5 cm. long and 6-7 mm. broad, oblanceolate, acute, terminal half serrulate, 7-nerved. Lip about 3.5 cm. long and 1.8 cm. broad, oblong-oval, truncate or shallowly retuse, terminal half lacerate-dentate; disc with several





Fig. 70. *Sobralia Allenii*



inconspicuous longitudinal carinae and with a small bipartite callus thickening at the base, pubescent longitudinally along the middle, especially toward the apex.

Panama.

COCLÉ: hills north of El Valle de Antón, alt. 1000 m., *Allen 2686*.

2. *SOBRALIA amabilis* (Reichb. f.) L. Wms., comb. nov.

*Fregea amabilis* Reichb. f. in Bot. Zeit. 10:712. 1852; Beitr. Orch. Centr.-Am. 10, t. 2. 1866.

Epiphytic or terrestrial herbs up to 6 dm. tall. Leaves 3–10.5 cm. long and 1–3.5 cm. broad, elliptic to broadly lanceolate-elliptic, acuminate; leaf-sheaths prominently verrucose. Inflorescence a single terminal flower; flower small for the genus, purple. Sepals 23–27 mm. long and 7–8 mm. broad, elliptic to elliptic-ob lanceolate, acute, apiculate. Petals 20–25 mm. long and 8–10 mm. broad, broadly elliptic to elliptic-obovate, obtuse or acute. Lip 30–35 mm. long and 20–25 mm. broad, quadrate-obovate, emarginate, somewhat narrowed at the base and enfolding the column; column 10–15 mm. long.

Costa Rica and Panama.

CHIRIQUÍ: An einer nassen und kalten Stelle, Cordilleren von Chiriquí, *Warscewicz*.

The original species of the genus *Fregea*, which we do not consider distinct from *Sobralia*.

3. *SOBRALIA BLETIAE* Reichb. f. in Bot. Zeit. 10:713. 1852.

Plants of unknown but probably large size. Leaves 10–17 cm. long and 3–4.5 cm. broad, elliptic to broadly lanceolate, acute. Lip about 4 cm. long and about 2 cm. broad, cuneate or narrowly obovate in outline, 3-lobed; lateral lobes lanceolate-triangular, falcate; mid-lobe obovate-orbicular, emarginate, slightly exceeding the lateral lobes; disc with five crisped lamellae.

Panama.

CHIRIQUÍ: *Warscewicz*.

We have seen no material of this species. The description is taken from the original and from a photograph of the very poor type specimen.

4. *SOBRALIA BOUCHEI* Ames & Schweinf., Sched. Orch. 10:4. 1930.

Slender terrestrial or epiphytic herbs up to 7.5 dm. tall. Stems about 3–4 mm. in diameter. Leaves 8–17 cm. long and 3–4.5 mm. broad, elliptic or broadly elliptic-lanceolate, acute, marginate. Sepals 5.5–6.5 cm. long and 1.5–1.7 cm. broad, elliptic to lanceolate, the laterals somewhat arcuate. Petals about 6 cm. long and 2.2 cm. broad, elliptic-ob lanceolate, acute, somewhat oblique. Lip about 5.5 cm. long and 5 cm. broad, obovate-orbicular, trilobulate, margins crenulate-dentate anteriorly; mid-lobe small, suborbicular; disc with 7 longitudinal, crispate carinae. Column about 2.5 cm. long.

Panama.

COCLÉ: El Valle de Antón, alt. about 1000 m., *Allen 2454*. "PANAMÁ": *Bouché s. n.*

Probably the original came from Coclé or Chiriquí. It is very closely allied to *S. Bletiae* Reichb. f.



5. *SOBRALIA callosa* L. Wms., nom. nov.

*Lindsayella amabilis* Ames & Schweinf. in Bot. Mus. Leafl. Harv. Univ. 5:33. 1937, non *Sobralia amabilis* (Reichb. f.) L. Wms.

Slender, caespitose (?), epiphytic or terrestrial herbs up to about 4 dm. tall. Leaves 4.5–10.5 cm. long and 3–8 mm. broad, narrowly elliptic to linear-lanceolate, acute or obtuse, apex 2–3-dentate, prominently plicate; leaf-sheaths concealing the stems, striate, glabrous. Inflorescence usually 1-flowered, from the axis of the uppermost leaf. Sepals 20–25 mm. long and 7–8 mm. broad, elliptic, acute, the laterals slightly arcuate, slightly connate at the base. Petals 2, 20–23 mm. long and 10–12 mm. broad, lanceolate to lanceolate-ovate, acute. Lip about 30 mm. long and about 20 mm. broad toward the apex, triangular-obovate in outline, emarginate, somewhat crenate, the lamina with 1 prominent, crispate lamella and with a prominent oblong-obovoid callus at the base. Column about 10–12 mm. long.

Panama.

COCLÉ: a specimen originally collected in Coclé, cultivated in the Canal Zone Experiment Gardens, *Lindsay 449*.

6. *SOBRALIA FENZLIANA* Reichb. f. in Bot. Zeit. 10:714. 1852.

Slender terrestrial or epiphytic herbs. Leaves 13–17 cm. long and 4–6 cm. broad, elliptic-oblong to lanceolate-ovate, acuminate. Sepals about 4 cm. long, elliptic or oblong-elliptic, acute. Petals a little shorter than the sepals, narrowly obovate, acute. Lip (4–6 cm. long?) obovate-orbicular, crenate-dentate anteriorly, ecarinate.

Panama.

CHIRIQUÍ: *Warscewicz 48*.

The description is taken from the original and an analysis of the type. Seems to differ from *S. Bouchei* only in lacking carinae on the lip.

7. *SOBRALIA FRAGRANS* Lindl. in Gard. Chron. 598. 1853.

*Sobralia eublepharis* Reichb. f. ex Kränzl. in Fedde Rep. Sp. Nov. 26:255, *t.* 78. 1929.

Relatively small, terrestrial or epiphytic herbs up to 35 cm. tall. Stems ancipitous, with the principal leaf near the middle. Leaves 6.5–23.5 cm. long and 1.5–5 cm. broad, narrowly elliptic to broadly lanceolate, acute or acuminate. Sepals 3–4 cm. long and 0.4–0.7 cm. broad, linear to oblong-lanceolate, acute or apiculate, the laterals somewhat falcate. Petals 3–4 cm. long and about 0.5 cm. broad, lanceolate to oblanceolate-linear, obtuse or acute, sometimes apiculate. Lip 28–35 mm. long and 16–20 mm. broad, oval to obovate, the anterior margin dentate-fimbriate, the posterior margins entire; disc with several thickened nerves and 2 callus thickenings at the base, pubescent especially toward the apex. Column about 16–18 mm. long.

British Honduras, Guatemala, Honduras, Costa Rica and Panama.

CHIRIQUÍ: San Felix to Cerro Flor, alt. 100–800 m., *Allen 1941*. VERAGUAS: headwaters of Río Cañazas, alt. 300–600 m., *Allen 167*. COCLÉ: between Las Margaritas and



El Valle, Woodson, Allen & Seibert 1314. PANAMÁ: drowned forest near Vigia and San Juan, Dodge, Steyermark & Allen 16521. CANAL ZONE: Powell 114, 3404, 3424.

Perhaps the most distinctive of the Panamanian species of the genus.

8. *SOBRALIA LABIATA* Warsz. & Reichb. f. in Bot. Zeit. 10:714. 1852.

A plant of unknown size. Leaves up to about 27 cm. long and 2 cm. broad, linear-lanceolate, acuminate. Sepals about 6 cm. long, oblong-lanceolate, acute. Petals about as long as the sepals and a little broader. Lip about 7–8 cm. long and 5–6 cm. broad, flabellate, anteriorly crenulate, retuse.

Panama.

CHIRIQUÍ: Warscewicz.

The description is taken from the original and a poor analysis of the type.

9. *SOBRALIA LEUCOXANTHA* Reichb. f. Beitr. Orch. Centr.-Am. 68. 1866; Hook. f. in Bot. Mag. 115: t. 7058. 1889.

*Sobralia Powellii* Schltr. in Fedde Rep. Sp. Nov. Beih. 17:11. 1922.

Tall, slender, terrestrial or epiphytic herbs up to 1.5 m. tall. Leaves 8–22 cm. long and 3–7 cm. broad, elliptic to lanceolate, acuminate, glabrous above, more or less scurfy below; leaf-sheaths verruculose or obscurely punctate. Inflorescence 1-flowered; the flowers large. Sepals and petals white, the lip white with the throat yellow to orange. Sepals 5–8.5 cm. long and 1.5–2.5 cm. broad, linear-lanceolate to oblong. Petals 5–7 cm. long and 2.5–3.5 cm. broad, oblong to obovate. Lip 5–7 cm. long and up to 5 cm. broad, obovate, enfolding the column, somewhat retuse, margin undulate, with short calluses at the base and 1–3 thickened nerves above. Column 3–4.6 cm. long.

Costa Rica and Panama.

COCLÉ: south of El Valle, alt. 600 m., Allen 2839, 2840; mountains beyond La Pintada, alt. 400–600 m., Hunter & Allen 620. PANAMÁ: Peluca Hydrographic Station, alt. about 90 m., Hunter & Allen 648; Gatún Lake, Powell 2, 3329, 3330, 3331.

There seems to be little or no difference between *Sobralia leucoxantha* and *S. Powellii*.

10. *SOBRALIA LINDLEYANA* Reichb. f. in Bot. Zeit. 10:713. 1852; Xenia Orch. 2:156, t. 163. 1868.

Slender epiphytic or terrestrial herbs up to 6 dm. tall. Leaves 5.5–13 cm. long and 2–5 cm. broad, elliptic-lanceolate to ovate-lanceolate, acuminate, often vernicose above; sheaths neither pubescent nor verruculose. Inflorescence 1-flowered; the flowers white or (with age?) yellowish, the lip with red maculations. Sepals 4–5 cm. long and 0.8–1.2 cm. broad, elliptic-lanceolate to elliptic-oblong, acute. Petals 3.5–4.5 cm. long and 1.2–1.4 cm. broad, similar to the sepals or broader. Lip 4–5 cm. long and 3–4 cm. broad, cuneate-flabellate or obovate, sub-trilobate, the lobes rounded, apical part of the lip dentate-lacerate or crisped; disc with a tricornute callus at the base and pubescent longitudinally within. Column about 2 cm. long, with 2 acinaciform, terminal steldia or auricles.





Fig. 71. *Sobralia panamensis*



Costa Rica and Panama.

CHIRIQUÍ: Llanos del Volcán, alt. 1120–1200 m., *Seibert* 325; Chiriquí Viejo Valley, *White* 83; "Chiriquí," *Warscewicz*.

11. *SOBRALIA PANAMENSIS* Schltr. in Fedde Rep. Sp. Nov. Beih. 17:11. 1922.  
*Sobralia panamensis* var. *albiflos* Schltr. loc. cit.

Erect or ascending, epiphytic or terrestrial herbs; the stems up to about 15 dm. long, simple, branching or producing new plants at the nodes, lepidote or furfurescent. Leaves 5–20 cm. long and 2–6.5 cm. broad, elliptic to broadly elliptic-lanceolate, acuminate, glabrous or slightly furfurescent at the base dorsally; leaf-sheaths densely pubescent, lepidote or furfurescent, older sheaths appearing pustulate. Flowers purple to white. Sepals 4.5–6 cm. long and about 1.2–1.6 cm. broad, ligulate to lanceolate, acute, the laterals somewhat oblique. Petals a little shorter than the sepals and up to about 2 cm. broad, obtuse or acute. Lip 4–6 cm. long and 3–4 cm. broad, obovate or oblong-obovate, obtuse, glabrous, apex undulate, with 2 small calluses at the base. Column up to about 3 cm. long.

Panama.

COCLÉ: mountains beyond La Pintada, alt. 400–600 m., *Hunter & Allen* 664. PANAMÁ: Taboga Island, *Allen* 106; Bejuco, *Allen* 2669; Hacienda La Joya, *Dodge et al.* 106c. CANAL ZONE: Santa Rita Trail, *Cowell* 146; Quebrada Ancha, *Dodge & Steyermark* 106a, 106b; near Vigía and San Juan, *Dodge et al.* 16557; hills east of canal, *Powell* 21, 31, 3082, 3086, 3105; Barro Colorado Island, *Woodworth & Vestal* 388.

*Sobralia panamensis* is closely allied to *S. decora* Batem. and to *S. sessilis* Lindl. but seems to be distinct.

12. *SOBRALIA DECORA* Batem. var. *AERATA* Allen & Williams in Ann. Missouri Bot. Gard. 29:337, t. 31. 1942.

Slender, erect, epiphytic or terrestrial herbs up to about 5 or 6 dm. tall. Stems covered with the amplexicaul leaf-sheaths, simple or rarely branched. Leaves 8–16 cm. long and 1.3–5 cm. broad, lanceolate or lanceolate-ovate, acuminate, coriaceous. Inflorescence sessile, 1-flowered. Sepals 5.2–5.5 cm. long and 1.2–1.5 cm. broad, lanceolate, acute, greenish on the outer surface, very near "brick red" on the inner surfaces. Petals about 4.7 cm. long and 1–1.2 cm. broad, elliptic-lanceolate, acute, reflexed, washed "brick red" with lighter margins and dorsal median line, the inner surface "brick red" with a white border. Lip about 4 cm. long, more or less tubular but flaring at the apex, the disc "brick red" with a median white stripe and the lateral margins white toward the base, base of the lip "Acajou red" within.—Description from the type specimen and ample field notes.

The species is found from Mexico to Honduras. The variety only in Panama.

COCLÉ: bad lands south of El Valle de Antón, alt. 500–600 m., *Allen* 2755, 2846.

13. *SOBRALIA ROLFEANA* Schltr. in Fedde Rep. Sp. Nov. Beih. 17:12. 1922.

Erect, slender, probably terrestrial herbs up to about 1 m. tall. Leaves 6.5–21 cm. long and 2–7.5 cm. broad, oblong-elliptic to elliptic-ob lanceolate or elliptic-lanceolate, acute to acuminate, glabrous and smooth, mostly near the





Fig. 72. *Sobralia decora* var. *aerata*

middle of the stem and above, reduced upward. Inflorescence probably consisting of a single flower in the axis of an upper leaf; flowers creamy-yellow with a lemon-yellow throat. Sepals 5.5–7.5 cm. long and 0.8–1.6 cm. broad, ligulate to elliptic or elliptic-lanceolate, acute, the laterals somewhat oblique. Petals 5.5–6.5



cm. long and 0.8–1.4 cm. broad, ligulate to oblong-ligulate, obtuse or acute. Lip 5.5–7 cm. long and 2.5–4.7 cm. broad, obovate, retuse, anterior margin lacerate-dentate, obscurely bilamellate at the base, glabrous. Column 2–3 cm. long, enfolding the lip.

Panama.

PANAMÁ: Cerro Campana, alt. 800 m., *Allen 2663*. CANAL ZONE: without definite locality, *Powell 3, 3327, 3357, 3358, 3374*. BOCAS DEL TORO: epiphyte with yellow flowers, *von Wedel 409*.

*Sobralia Rolfeana* is very closely allied to *S. leucoxantha* Reichb. f. and to *S. Lindleyana* Reichb. f.

14. SOBREALIA SUAVEOLENS Reichb. f. in *Gard. Chron.* n. s. 9:622. 1878.

*Sobralia epiphytica* Schltr. in *Fedde Rep. Sp. Nov.* 12:213. 1913.



Fig. 73. *Sobralia suaveolens*

Strict terrestrial or epiphytic herbs up to about 4 dm. tall. Leaves 5–19 cm. long and 2–4.5 cm. broad, elliptic to elliptic-lanceolate, acute; leaf-sheaths glabrous, not verrucose. Inflorescence usually 2–3-flowered, from the axils of the uppermost leaf; flowers small for the genus, yellow. Sepals and petals 20–25 mm. long and 4–5 mm. broad, linear-lanceolate, acute. Lip 20–25 mm. long and about 10–15 mm. broad, oval to ovate in outline, trilobulate toward the apex, with several (about 7) longitudinal lamellae which become lacerated toward the apex and are branched into two groups at the base; mid-lobe about 8 mm. long and broad,

subquadrate. Column about 12 mm. long.

Panama.

PANAMÁ: Río La Maestra, alt. 0–25 m., *Allen 59*. CANAL ZONE: near Vigia and San Juan on R. Pequení, alt. 66 m., *Dodge et al. 16623*; Río Indio de Gatún, alt. sea-level, *Maxon 4829*; around Culebra, alt. 50–150 m., *Pittier 4780*.

The type was a specimen collected near Colón and grown in England.

15. SOBREALIA VALIDA Rolfe in *Kew Bull.* 1909:65. 1909.

Stems robust, glabrous, 20–25 cm. tall, 3–4-leaved, base covered with 2 tubular sheaths. Leaves broadly elliptic, subacute, subplicate, glabrous, subcoriaceous, 12–20 cm. long, 6–8.5 cm. broad, amplexicaul; sheaths tubular, subcompressed, ancipitous, 3–5 cm. long. Spathe abbreviated, subfoliaceous, apex subacute.



Bracts small. Flowers few, appearing at intervals, ochroleucous, fragrant. Pedicels short, subincluded. Sepals subconnivent, lanceolate-oblong, acute, equal, more or less concave. Lip entire, oblong, obtuse, minutely crenulate, concave, about 4 cm. long; disc tricarinate, veins pilose at the apex. Column clavate, 2 cm. long; teeth linear-oblong, incurved, about 4 mm. long.

Panama.

DARIÉN: near the Darién Gold Fields, *Dr. Hodgkinson*.

No specimens were seen. The description is taken from the original Latin.

16. *SOBRALIA WARSZEWICZII* Reichb. f. in *Bot. Zeit.* 10:714. 1852; *Beitr. Orch. Centr.-Am.* 9, t. 1, figs. 1, 1-2. 1866.

Terrestrial herbs of unknown height. Stems robust, the younger ones hispidulous-pubescent, becoming glabrous and more or less verrucose with age. Leaves 13-18 cm. long and 4-6 cm. broad, elliptic-oval, acute or acuminate. Inflorescence a single terminal or subterminal flower; flowers average for the genus, purple. Sepals up to about 5 cm. long and 2 cm. broad, broadly oblanceolate. Petals about as long as and broader than the sepals, cuneate-obovate, acute. Lip about 5 cm. long and 3 cm. broad, flabellate, emarginate, apical part crisped, with 2 basal lamellae, somewhat verrucose at the base. Column 2-3 cm. long.

Panama.

CHIRIQUÍ: "Vulcanes von Chiriquí," alt. 1850 m., *Warszewicz* 8.

We have seen only a photograph and a record of the type.

#### OBSCURE SPECIES

- SOBRALIA MACROPHYLLA* Reichb. f. in *Bot. Zeit.* 10:713. 1852; *Xenia Orch.* 1:218, t. 90. 1856.

The type of this species is apparently a sterile specimen which was accompanied by the collector's sketch and color notes. Reichenbach later published a plate of the species and at the same time reduced the Brazilian *S. chlorantha* Hook. to synonymy. Inasmuch as the type is not satisfactory for diagnosis in this difficult genus we think it best to place *S. macrophylla* among the obscure species. It is possible that it and *S. Rolfeana* Schltr. are the same.

#### 8. PALMORCHIS Barb. Rodr.

- PALMORCHIS* Barb. Rodr. *Gen. & Sp. Orch.* Nov. 1:169. 1877; Schweinf. & Correll in *Bot. Mus. Leafl. Harv. Univ.* 8:109. 1940.

*Jenmania* Rolfe in *Kew Bull.* 198. 1898, non Wächter, 1897.

*Rolfea* Zahlbr. in *Jour. Bot.* 36:493. 1898.

*Neobartlettia* Schltr. in *Fedde Rep. Sp. Nov.* 16:440. 1920.

Large or small, terrestrial, reed-like herbs. Leaves pergameneous, plicate-veined, petiolate, usually few. Inflorescence a terminal or axillary raceme or



panicle. Sepals equal or nearly so, connivent or somewhat spreading. Petals similar to the sepals but narrower and shorter. Lip erect from the base of the column and adnate with it toward the base along the median line, broader than the sepals and petals, enfolding the column, retuse or 3-lobed; the disc pubescent or glabrous, callused. Column elongated, slender, more or less arcuate, footless; anther incumbent, operculate, the terminal part fleshy and sterile; pollinia 4, pyriform, granular or subceraceous.

A small genus allied to *Sobralia*. There are eight or nine species with the center of distribution in northern South America. Specimens have not been often collected.

- a. Disc of the lip without parallel lamellae; flowers about 13 mm. long.... 1. *P. TRILOBULATA*  
 aa. Disc of the lip with 5 parallel lamellae; flowers about 17 mm. long..... 2. *P. POWELLII*

1. *PALMORCHIS TRILOBULATA* L. Wms. in Ann. Missouri Bot. Gard. 28:415, *t.* 20. 1941.

Caespitose, terrestrial herbs up to 35 cm. tall. Stems up to about 15 cm. long and 4 mm. in diameter, bearing 3-4 leaves near the apex. Leaves subchartaceous, plicate; lamina of the mature leaves 10-22 cm. long and 3-6 cm. broad, elliptic, acute or acuminate, with 7 prominent nerves; petiole up to 7 cm. long, plicate, nervose. Inflorescence up to 7 cm. long, terminal, much exceeded by the leaves, few-flowered; rachis about 3-4 cm. long; bracts 1-1.5 cm. long and 1.5-5 mm. broad, elliptic to lanceolate-ovate, acute or acuminate. Flowers about 13 mm. long, white. Dorsal sepal about 12 mm. long and 3 mm. broad, spatulate-ob-lanceolate, obtuse, 3-5-nerved. Lateral sepals 10-12 mm. long and 3-4 mm. broad, arcuate, spatulate-ob-lanceolate, obtuse, 3-5-nerved, somewhat carinate along the mid-nerve dorsally. Petals 11-12 mm. long and about 2 mm. broad, linear-ob-lanceolate, obtuse, somewhat arcuate, 3-nerved. Lip about 10-12 mm. long and about 5-6 mm. broad near the apex, ob-lanceolate-flabellate, trilobulate at the apex, the base or claw adnate to the column along its median line for about 2-3 mm., more or less enfolding the column; disc of the lip pubescent, especially so toward the base, less pubescent and fleshy-thickened toward the apex; lateral lobes about 1 mm. long (free portion), rounded, obtuse; mid-lobe about 1.5 mm. long, transversely oblong, blunt, slightly exceeding the lateral lobes. Column slender, arcuate, about 10 mm. long; anther operculate, incumbent; pollinia 4, exappendiculate, ceraceous or appearing so, pyriform.

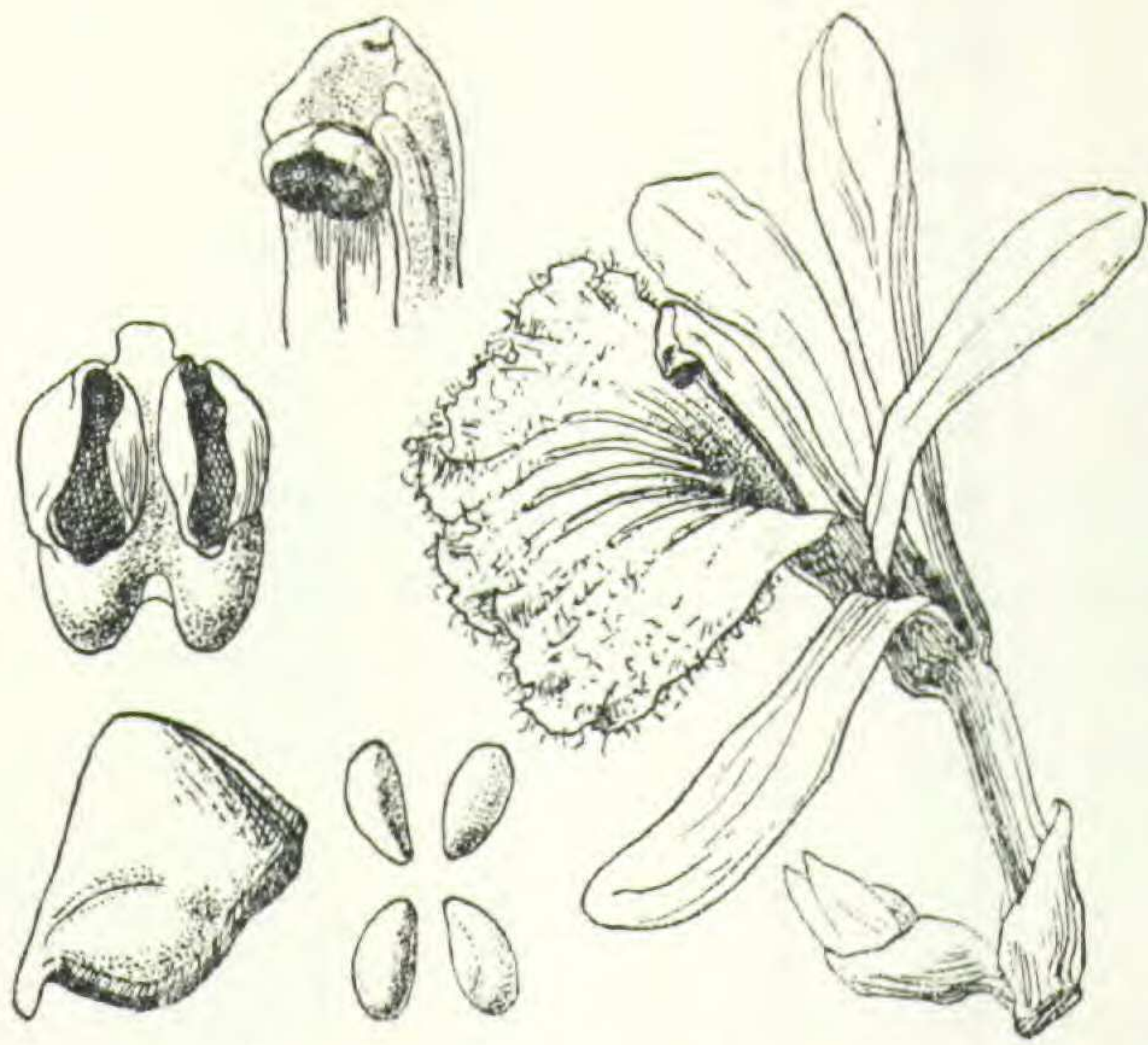
Panama.

COCLÉ: El Valle de Antón, alt. 1000 m., *Allen 2463*; alt. 500-700 m., *Seibert 459*.

2. *PALMORCHIS POWELLII* (Ames) Schweinf. & Correll in Bot. Mus. Leaflet. Harv. Univ. 8:119. 1940.

*Rolfea Powellii* Ames, Sched. Orch. 7:32, *fig.* 6. 1924.



Fig. 74. *Palmorchis Powellii*

Caespitose, terrestrial herbs up to about 60 cm. tall. Stems about 30 cm. tall and 3–4 mm. in diameter. Leaves subchartaceous, plicate; lamina of the mature leaves 15–28 cm. long and 3–5 cm. broad, elliptic-lanceolate, acuminate, with 5–7 prominent nerves; petiole up to 8 cm. long, plicate, nervose. Inflorescence terminal or axillary, up to 5 cm. long, simple or branched; bracts 5–6 mm. long, ovate, acute. Flowers about 17 mm. long, white. Dorsal sepal about 15 mm. long and 3 mm. broad, spatulate, obtuse. Lateral

sepals similar to the dorsal sepal but slightly arcuate. Petals about 15 mm. long and 3 mm. broad, rotundate-flabellate, trilobulate in front; disc pilose, with 5 parallel lamellae. Column about 12 mm. long, slender, arcuate.

Panama.

CANAL ZONE: Barro Colorado Island, *Starry* 323; "Juan Diaz," near Panamá City, *Powell* 325.

#### 9. STENOPTERA Presl

STENOPTERA Presl, *Rel. Haenk.* 95, *t.* 14, 1827; L. Wms. in *Caldasia* 5:11. 1942. *Gomphichis* Lindl. *Gen. & Sp. Orch. Pl.* 446. 1840.

Terrestrial leafy herbs. Leaves radical or cauline, contracted or petiolate at the base. Inflorescence a terminal, compact or loose spike. Flowers mostly small, non-resupinate. Sepals subequal or the dorsal narrower, free or joined into a short tube at the base, subconnivent to recurved. Petals linear to nearly as broad as the sepals. Lip uppermost, erect or parallel to the column, contracted or unguiculate at the base, simple or 3-lobed lamina plane or concave or subgaleate. Column subterete, erect, wingless, glabrous or villous; anther erect in the clinandrium; pollen granular or dust-like. Capsule ovoid, erect.

The single species known in Panama has been referred to *Gomphichis*, but there are several species, unknown to Lindley, which seem absolutely to close the gap between the two presumed genera.

1. STENOPTERA COSTARICENSIS Schltr. in *Beih. Bot. Centralbl.* 36, Abt. 2:375. 1918.

*Gomphichis costaricensis* Ames, Hub. & Schweinf. in *Bot. Mus. Leafl. Harv. Univ.* 3:37. 1934.

Terrestrial herbs up to about 6 dm. tall. Leaves basal or those on the stem reduced to bracts, 7–30 cm. long and 2.5–3.5 cm. broad, mostly elliptic-lanceolate,



acute or acuminate, contracted at the base into a broad petiole. Scape erect, with several bracts which are reduced upward, villous above but glabrescent below. Inflorescence a spike 3–16 cm. long. Dorsal sepal about 8 mm. long and 2.5 mm. broad, broadly elliptic, acute or acuminate, cucullate, 1-nerved, pubescent dorsally. Lateral sepals similar to the dorsal but more oblong and oblique. Petals 3.5–5 mm. long and 2.5–3.5 mm. broad, elliptic-ovate, acute or obtuse, ciliate or subfimbriate, slightly cucullate, 3-nerved. Lip 4–5 mm. long and 3–4 mm. broad, 3-lobed, slightly unguiculate; lateral lobes rounded; terminal lobe ovate, about 2 mm. long and 1.5 mm. broad, fleshy, villous; disc fleshy, villous; with a small marginal callus on either side at the base. Column about 3 mm. long, terete, straight or nearly so. Capsule ovoid.

Costa Rica, Panama, and possibly South America.

CHIRIQUÍ: Bajo Chorro, alt. 2000 m., *Davidson 163, 309.*

This species is an Andean type and has several close allies, if not synonyms, in the Andes.

#### 10. PRESCOTTIA Lindl.

PRESCOTTIA Lindl. in Hook. Exot. Fl. 2: *t. 115.* 1824.

Small terrestrial herbs with basal or semi-basal leaves. Leaves usually radical (Panama), sessile or petiolate, membranaceous, large or small. Inflorescence a terminal spike. Flowers small, non-resupinate. Sepals connate at their bases into a tube, spreading or revolute. Petals narrow, adnate to the base of the column, often revolute. Lip uppermost, unguiculate and with the claw adnate to the sepals, lamina plane to concave, cucullate or galeate, biauriculate at the base, often enclosing the column. Column short; stigmata 2; clinandrium erect, acuminate or subfilamentous, the margins adnate to the rostellum; pollen granular or powdery.

A small genus with but two distinctive species known in Panama.

- a. Lamina of the leaf less than 7 cm. long; petiole much shorter than the lamina..... 1. *P. OLIGANTHA*  
 aa. Lamina of the leaf more than 7 cm. long (usually 10–20 cm.); petiole about as long as the lamina..... 2. *P. STACHYODES*

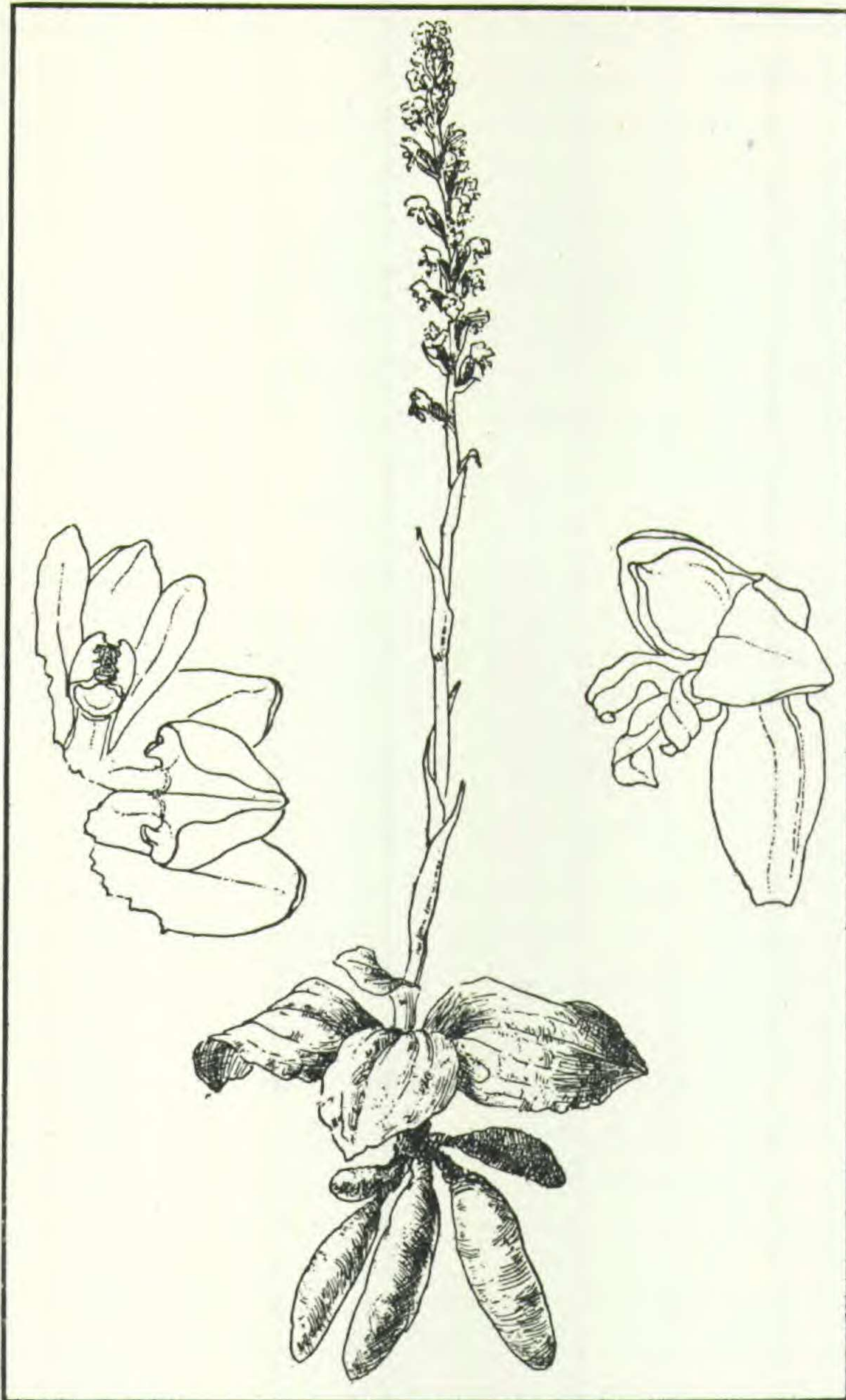
1. *PRESCOTTIA OLIGANTHA* (Sw.) Lindl. Gen. & Sp. Orch. Pl. 454. 1840; C. Schweinf. in Bot. Mus. Leafl. Harv. Univ. 7:20. 1938.

*Cranichis oligantha* Sw. Prodr. Veg. Ind. Occ. 120. 1788.

*Prescottia panamensis* Schltr. in Fedde Rep. Sp. Nov. 16:357. 1920.

Small erect terrestrial herbs up to about 32 cm. tall. Leaves 1.5–7 cm. long and 0.8–3 cm. broad, basal, membranaceous, suberect or spreading, elliptic to cordate or obovate, acute or obtuse; petiole shorter than the lamina, usually much shorter. Scape erect, slender, glabrous, with several bracts which are reduced upward. Inflorescence up to 10 cm. long, a densely flowered spike. Sepals 1.5–3 mm. long and 0.6–1 mm. broad, oblong-ovate, obtuse, the laterals oblique, connate



Fig. 75. *Prescottia oligantha*

into a short tube at the base and forming an inconspicuous mentum. Petals 1–1.5 mm. long and about 0.5 mm. broad, linear-oblong, obtuse, somewhat oblique. Lip 1.5–2 mm. long and as broad, suborbicular, strongly cucullate, with a small auriculate callus on either side at the base; the disc puberulent. Column about 0.5 mm. long.

Florida, Mexico, Costa Rica, Panama, the West Indies, Venezuela, and Colombia.

CHIRIQUÍ: Cerro Vaca, alt. 900–1000 m., *Pittier 5358*. COCLÉ: valley of upper Río Mata, alt. 350 m., *Allen 130*; vicinity of El Valle, alt. 600–1000 m., *Allen 1159*.

2. *PRESCOTTIA STACHYODES* (Sw.) Lindl. in *Bot. Reg.* 22: *sub t.* 1916. 1836; L. Wms. in *Ann. Missouri Bot. Gard.* 27:272. 1940.

*Cranichis stachyodes* Sw. *Fl. Ind. Occ.* 3:1427. 1799.



Terrestrial herbs, up to about 1 m. tall. Leaves basal, long-petiolate, large, membranaceous, suberect; petiole up to about 25 cm. long, slender; lamina 8–22 cm. long and 3–16 cm. broad (those of Panamanian specimens large), elliptic or elliptic-oval to broadly oval, acute, acuminate or obtuse, margin often sphacelate. Inflorescence a densely flowered spike up to about 30 cm. long. Sepals 3–5 mm. long and 0.75–1.25 mm. broad, linear-oblong, obtuse, 1-nerved, strongly coiled, connate at their bases into a short tube. Petals 3–5 mm. long and 0.2–0.5 mm. broad, linear, obtuse, 1-nerved. Lip 4–6 mm. long, strongly concave or calceiform, short-unguiculate, with a lateral callus on either side at the base, glabrous. Column about 2 mm. long.

Mexico, British Honduras, Guatemala, Honduras, Panama, the West Indies, Colombia, Brazil, and perhaps elsewhere in South America.

COCLÉ: vicinity of El Valle de Antón, alt. 600–1000 m., *Allen 1183*; same locality, *Allen 2064*; hills north of El Valle de Antón, vicinity of La Mesa, alt. about 1000 m., *Allen 2326*; mountains beyond La Pintada, *Hunter & Allen 623*.

#### 11. CRANICHIS Sw.

CRANICHIS Sw. Nov. Gen. & Sp. Prodr. 8, 120. 1788.

Small terrestrial herbs with basal leaves or rarely with reduced cauline leaves. Leaves sessile or petiolate, membranaceous. Scape slender, simple, with several bracts. Inflorescence a terminal spike. Sepals free, similar, or the laterals often broader. Petals free or obscurely adnate to the base of the column. Lip uppermost (i. e. flowers non-resupinate), sessile or rarely unguiculate, adnate to the base or up to the middle of the column, erect, plane, concave or saccate. Column short; rostellum erect, often as long as the column; pollen granular.

A small genus with but one species known in Panama.

##### 1. CRANICHIS MUSCOSA Sw. Nov. Gen. & Sp. Prodr. 120. 1788.

Small terrestrial herbs 10–38 cm. tall. Leaves petiolate, basal or semi-basal, usually with leaf-like bracts at the base of the scape, which are reduced upward; lamina 3–8 cm. long and 1–4 cm. broad, elliptic, elliptic-oval or oval, acute or obtuse, membranaceous; petiole 1–8 cm. long, usually a little shorter than the lamina. Dorsal sepal about 2.5 mm. long and 1 mm. broad, elliptic-lanceolate, cucullate, obtuse or acute. Lateral sepals about 2.5 mm. long and 1 mm. broad, ovate-lanceolate, oblique, obtuse or acute. Petals 2–3 mm. long and 0.3–0.5 mm. broad, linear or linear-oblong. Lip 2.5–3 mm. long and 1.5–2 mm. broad, simple, strongly cucullate, elliptic-oval to oblong-oval, acute or acutish. Column 1–1.5 mm. long.

Florida, Mexico, Costa Rica, Panama, and the West Indies.

COCLÉ: vicinity of El Valle, alt. 800–1000 m., *Allen 74*, alt. 600–1000 m., *Allen 1235*.

#### 12. PONTIEVA R. Br.

PONTIEVA R. Br. in Ait. Hort. Kew. ed. 2, 5:199. 1813; Benth. & Hook. Gen. Pl. 3:593. 1883.



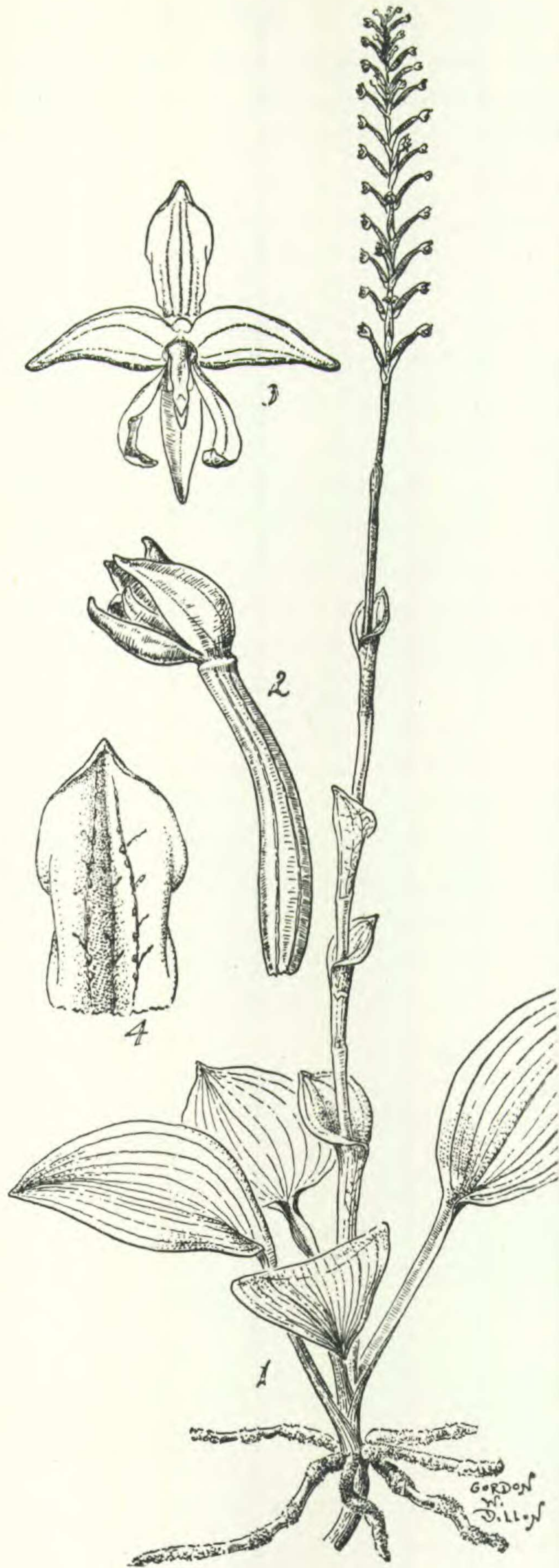


Fig. 76. *Cranichis muscosa*



Small glabrous or pilose terrestrial herbs with basal leaves and naked or bracteate scapes. Sepals free, spreading, subequal or dorsal smallest. Petals attached above the middle of the column, spreading. Lip uppermost (non-resupinate), adnate to the column by its unguiculate base, abruptly dilated from the claw. Pollinia granular.

A small genus limited to the warmer regions of the western hemisphere.

- a. Leaves pilose-pubescent..... 3. *P. MACULATA*  
 aa. Leaves glabrous.  
 b. Lip with 2 small calluses at the base of the blade..... 1. *P. EPHIPIUM*  
 bb. Lip without calluses at the base but the claw with a single callus.... 2. *P. RACEMOSA*

1. *PONTHIEVA EPHIPIUM* Reichb. f. in *Linnaea* 28:382. 1856; L. Wms. in *Ann. Missouri Bot. Gard.* 26:280. 1939.

Small terrestrial herbs up to about 3.5 dm. tall. Leaves basal, 5–12 cm. long and 1.2–3.5 cm. broad, petiolate, variable, elliptic to oblong to oblanceolate to oval or subcordate, acute or obtuse, membranaceous. Inflorescence a few–several-flowered raceme on a bracteate peduncle, pubescent. Flowers small, white. Dorsal sepal 4.5–7 mm. long and 1.5–2.5 mm. broad, elliptic to broadly oblanceolate, acute, pubescent dorsally. Lateral sepals 4.5–7 mm. long and 2–5 mm. broad, obliquely ovate, acute or obtuse, pubescent dorsally. Petals 4–6.5 mm. long and 1–3 mm. broad, oblique and with the anterior margin developed into a large sub-basal auricle or angle, unguiculate, obtuse. Lip 2–5 mm. long, trilobulate, unguiculate, attached near the apex of the column; the lamina from obovate in outline to transversely oblong, with 2 calluses near the base, mid-lobe small, about 0.5 mm. long; claw thickened.

Mexico, Guatemala, Honduras, and Panama.

CHIRIQUÍ: Finca Lérída to Boquete, alt. about 1300–1700 m., *Woodson, Allen & Seibert IIII8*.

2. *PONTHIEVA RACEMOSA* (Walt.) Mohr in *Contr. U. S. Nat. Herb.* 6:460. 1901; Ames & Schweinf. in *Sched. Orch.* 10:14. 1930.

*Arethusa racemosa* Walt. *Fl. Carol.* 222. 1788.

*Neottia glandulosa* Sims in *Bot. Mag.* 21:t. 842. 1805.

*Ponthieva glandulosa* R. Br. in *Ait. Hort. Kew.* ed. 2, 5:200. 1813.

*Ponthieva rostrata* Lindl. in *Ann. & Mag. Nat. Hist.* 15:385. 1845.

*Ponthieva oblongifolia* Rich. & Gal. in *Ann. Sci. Nat.* III, 3:30. 1845.

*Ponthieva guatemalensis* Reichb. f. in *Beitr. Orch. Centr.-Am.* 63. 1866.

*Ponthieva costaricensis* Schltr. in *Fedde Rep. Sp. Nov. Beih.* 19:84. 1923.

Mostly small terrestrial herbs up to about 6 dm. tall, but usually about 2–3 dm. tall. Leaves basal, 4–30 cm. long and 1.5–6 cm. broad, variable, elliptic to oblanceolate to ovate to obovate, acute, petiolate, glabrous. Inflorescence pubescent, a few–many-flowered, loose raceme; bracts prominent. Dorsal sepal 4–7 mm. long and 1.5–3 mm. broad, lanceolate, acute or acuminate, pubescent dorsally. Lateral sepals 4.5–7 mm. long and 2–4 mm. broad, oblique, lanceolate to ovate-





Fig. 77. *Pontbivia racemosa*



lanceolate, acute, pubescent dorsally. Petals 4.5–6 mm. long and 2–4 mm. broad, obliquely subovate or subtriangular, unguiculate, obtuse. Lip 4–7 mm. long and 2–5.5 mm. broad, trilobulate, unguiculate, suborbicular to subquadrate in outline; lamina fleshy, cucullate at the base; claw fleshy with a conspicuous callus at its base.

Virginia to Florida and Louisiana (U.S.A.), Mexico, Guatemala, Honduras, Costa Rica, Panama, the West Indies, and in South America to Peru.

CHIRIQUÍ: Volcán de Chiriquí, alt. 3500–4000 m., *Woodson & Schery 469*. COCLÉ: vicinity of El Valle, alt. 600–1000 m., *Allen 1161*. PANAMÁ: San Juan Range, alt. near sea-level, *Powell 356*.

3. *Ponthieva maculata* Lindl. in *Ann. & Mag. Nat. Hist.* 15:385. 1845; Hook. f. in *Bot. Mag.* 108: *t. 6637*. 1882.

*Ponthieva Brenesii* Schltr. in *Fedde Rep. Sp. Nov. Beih.* 19:165. 1923.

Small pubescent terrestrial herbs up to about 3 dm. tall. Leaves basal, 5–20 cm. long and 0.8–5.2 cm. broad, variable, linear-lanceolate or oblanceolate to ovate, acute or acuminate, petiolate, strigose-pubescent on both surfaces, membranaceous. Inflorescence a few–several-flowered raceme on a slender bracteate peduncle. Dorsal sepal 9–14 mm. long and 3–4.5 mm. broad, elliptic to lanceolate, acute or acuminate, pubescent dorsally. Lateral sepals 9–14 mm. long and 5.5–8 mm. broad, broadly oval to obovate, obtuse, pubescent dorsally. Petals 6–9 mm. long and 2–3 mm. broad, oblique, obtuse, angled toward the base anteriorly, short-unguiculate, inserted above the middle of the column. Lip 3–4 mm. long and 2–3 mm. broad, oblong to suborbicular, trilobulate, cucullate, with a hood-shaped callus which forms a cavity at the base, inserted near the apex of the column.

Mexico, Costa Rica, Panama, Venezuela, Colombia and Ecuador.

CHIRIQUÍ: Cerro Punto to headwaters of Río Caldera, alt. 2250–2500 m., *Allen 1430*.

One of the most pubescent orchids in Panama.

### 13. SPIRANTHES L. C. Rich.

*Spiranthes* L. C. Rich. in *Mém. Mus. Par.* 4:50. 1818, *nom. conserv.*; Schltr. in *Beih. Bot. Centralbl.* 37, Abt. 2:317–454. 1920.

*Gyrostachys* Pers. *Syn. Pl.* 2:511. 1807.

*Stenorrhynchus* L. C. Rich. in *Mém. Mus. Par.* 4:59. 1818.

*Pelexia* L. C. Rich. loc. cit. 59.

*Sarcoglottis* Presl, *Rel. Haenk.* 1:95, *t. 15*. 1827.

*Cyclopogon* Presl, loc. cit. 93.

*Beloglottis* Schltr. in *Beih. Bot. Centralbl.* 37, Abt. 2:364. 1920.

*Brachystele* Schltr. loc. cit. 370.

Small, or rarely large, terrestrial (rarely epiphytic) herbs with basal or cauline leaves or both, or leafless. Roots often fleshy, fasciculated or tuberous. Leaves various, produced before, with, or after, the flowers. Sepals free; dorsal sepal usually erect and forming a galea with the petals; lateral ones erect or spreading,



affixed to the summit of the ovary, decurrent and forming a free or adnate mentum. Petals usually narrow and usually coherent to the dorsal sepal. Lip sessile or clawed, plane, concave or gibbous, simple or lobed, in some species bicaudate at the base, adherent to the column in almost all the species, ecallose or callose. Column terete; clinandrium often membranaceous and conspicuous, often continued into the rostellum; rostellum various, inconspicuous or conspicuous, truncate and retuse to lobed to aristate; anther dorsal, erect, sessile or stipitate; pollinia 2, powdery or granular, usually attenuated at one end.

A large and technical genus with its main center of distribution in Mexico.

- a. Lip less than 8 mm. long.
  - b. Lip less than 3 mm. long..... 1. *S. GUYANENSIS*
  - bb. Lip 5 mm. or more long.
    - c. Lateral sepals linear-ligulate to ligulate; petals oblanceolate-ligulate.... 2. *S. COSTARICENSIS*
    - cc. Lateral sepals linear-lanceolate to narrowly lanceolate-triangular; petals linear to narrowly elliptic..... 3. *S. PRASOPHYLLUM*
- aa. Lip 13 mm. long or longer.
  - b. Lateral sepals forming a produced, acute or obtuse mentum at the base.
    - c. Lip bicaudate at the base..... 9. *S. FUNCKIANA*
    - cc. Lip not bicaudate at the base..... 8. *S. ORCHIOIDES*
  - bb. Lateral sepals not forming a produced, obtuse or acute mentum at their base.
    - c. Lip not bicaudate at the base; rostellum terete..... 6. *S. SPECIOSA*
    - cc. Lip bicaudate at the base; rostellum flattened or terete.
      - d. Terminal part of the lip not oval nor suborbicular nor with pubescent callus-ridges; rostellum terete..... 7. *S. NAVARRENSIS*
    - dd. Terminal part of the lip oval or suborbicular or with pubescent callus ridges; rostellum flattened.
      - e. Base of the stem leafy; plants from rhizomes..... 4. *S. WOODSONII*
      - ee. Base of the stem not leafy; plants from fascicled roots..... 5. *S. ACAULIS*

1. *SPIRANTHES GUYANENSIS* (Lindl.) Cogn. in Mart. Fl. Bras. 3<sup>4</sup>:209, t. 47, f. II. 1895.

*Goodyera guyanensis* Lindl. Gen. & Sp. Orch. Pl. 494. 1840.

*Brachystele guyanensis* Schltr. in Beih. Bot. Centralbl. 37, Abt. 2:373. 1920.

*Spiranthes aguacatensis* Reichb. f. in Bonplandia 3:214. 1855; Ames, Sched. Orch. 2:7. 1923.

*Gyrostachys aguacatensis* O. Ktze. Rev. Gen. 2:664. 1891.

*Brachystele aguacatensis* Schltr. loc. cit. 371.

Erect terrestrial herbs up to 20 cm. tall. Stems with several loose, lanceolate or ovate-lanceolate, acuminate bracts. Leaves unknown. Inflorescence up to 6 cm. long, densely flowered. Dorsal sepal 2–3 mm. long and about 0.7–1.5 mm. broad, lanceolate, acute or obtuse. Lateral sepals 2–3 mm. long and 0.7–1.5 mm. broad, lanceolate-triangular, acute or obtuse, somewhat oblique. Petals 2–2.5 mm. long and 0.6–0.9 mm. broad, oblanceolate-spatulate, truncate, or obtuse, coherent to the dorsal sepal, unguiculate. Lip 2–2.8 mm. long and 1.7–2.2 mm. broad, oblong-pandurate to ovate or suborbicular and constricted toward the apex, the terminal lobe small, oblong to suborbicular, with two retrorse auricles or caudae at the base.



Mexico, Guatemala, Honduras, Costa Rica, Panama, Trinidad, the Guianas, Colombia, and Bolivia.

CANAL ZONE: open fields near railway station, Monte Lirio, *Maxon 6862*.

The smallest-flowered species of *Spiranthes* in Panama.

2. *SPIRANTHES COSTARICENSIS* Reichb. f. in *Bonplandia* 3:214. 1855; *Beitr. Orch. Centr.-Am.* 46. 1866; *Xenia Orch.* 2:185, *t. 179, f. 1, 1-3b.* 1868; Ames, *Sched. Orch.* 9:7. 1925.

*Gyrostachys costaricensis* O. Ktze. *Rev. Gen.* 2:664. 1891.

*Beloglottis costaricensis* Schltr. in *Beih. Bot. Centralbl.* 37, Abt. 2:365. 1920.

*Spiranthes subpandurata* Ames & Schweinf. *Sched. Orch.* 8:4, *f. 1.* 1925.

Erect terrestrial or epiphytic herbs with basal leaves, or leafless at flowering time, up to 4.5 dm. tall. Leaves 3–18 cm. long and 1–5 cm. broad, elliptic to oval or oblanceolate, acute or acuminate, membranaceous, petiolate; petiole 2–8 cm. long. Inflorescence a few–many-flowered raceme, up to about 20 cm. long. Dorsal sepal 4–6.5 mm. long and 1–1.5 mm. broad, lanceolate, acute, pubescent dorsally. Lateral sepals 4–6.5 mm. long and 0.7–1.3 mm. broad, linear-ligulate to ligulate, acute or obtuse, pubescent dorsally. Petals 3.5–6 mm. long and 0.7–1 mm. broad, oblanceolate-ligulate, acute or obtuse, oblique, coherent to the dorsal sepal. Lip 5–6.5 mm. long and 1.5–2 mm. broad, lanceolate-pandurate, short-unguiculate, retrorsely bicaudate at the base.

Mexico, Guatemala, Honduras, Costa Rica and Panama.

CANAL ZONE: upper Chagres River Range, *Powell 377*.

A species easy to distinguish because of the unusual lip shape.

3. *SPIRANTHES PRASOPHYLLUM* Reichb. f. *Beitr. Orch. Centr.-Am.* 65. 1866; Ames, *Sched. Orch.* 9:8. 1925.

*Gyrostachys Prasophyllum* O. Ktze. *Rev. Gen.* 2:664. 1891.

*Spiranthes epiphytica* Schltr. in *Fedde Rep. Sp. Nov.* 2:130. 1906.

*Cyclopogon Prasophyllum* Schltr. in *Beih. Bot. Centralbl.* 37, Abt. 2:393. 1920.

Small epiphytic herbs 8–25 cm. tall, with basal leaves. Leaves short-petiolate; lamina 3–13 cm. long and 0.8–2.8 cm. broad, elliptic, acute; petiole 1–4 cm. long. Inflorescence 2–8 cm. long, the flowers often unilateral. Dorsal sepal 5–6 mm. long and 1–1.5 mm. broad, lanceolate, acute or acuminate, pubescent at the base dorsally. Lateral sepals 5–6.5 mm. long and 1–1.8 mm. broad, linear-lanceolate to narrowly lanceolate-triangular, acute, pubescent at the base dorsally. Petals 4–5 mm. long and 0.5–1 mm. broad, linear to narrowly elliptic, acute or obtuse, coherent to the dorsal sepal. Lip 5–7 mm. long and 2–3 mm. broad, narrowly oblong-pandurate to lanceolate-ovate and constricted toward the apex; apical lobe oblong to transversely oval or reniform, bicaudate at the base, the caudae retrorse or incurved.

Guatemala, Honduras, Costa Rica, and Panama.

COCLÉ: north of El Valle de Antón, alt. about 1000 m., *Allen 2904*. CANAL ZONE: Gatún, *Hayes 138*; forest, Río Indio at Gatún, *Maxon 4816*.





Fig. 78. *Spiranthes Prasophyllum*

4. *SPIRANTHES WOODSONII* L. Wms. in Ann. Missouri Bot. Gard. 29:337. 1942.

Terrestrial palustrine herbs up to 5.5 dm. tall. Rhizomes slender, rooting at most of the nodes, with scarious sheaths arising from the nodes. Stems slender, with well-developed leaves at the base which become bract-like above, glabrous



below but becoming densely pubescent above. Leaves 3–10 cm. long, 1.3–2.8 cm. broad, oblong-elliptic to oval, acute or obtuse, largest near the base of the stem and reduced to amplexicaul bracts above. Inflorescence up to 10 cm. long, flowers congested, becoming more open in fruit; bracts up to 4 cm. long and 1.6 cm. broad, lanceolate, acuminate, pubescent dorsally. Flowers large, similar to those of *S. acaulis*. Dorsal sepal 16.5–19 mm. long and 3.5–4 mm. broad, lanceolate, acuminate, 3–5-nerved, densely pubescent dorsally. Lateral sepals long-decurrent on the ovary, 35–40 mm. long from the apex to the base of the saccate mentum; free part 16.5–19 mm. long and 4–4.5 mm. broad, lanceolate, acuminate, arcuate, spreading, densely pubescent dorsally, 3–5-nerved. Petals 15–18 mm. long and 2–2.5 mm. broad, narrowly elliptic to narrowly oblanceolate, pubescent or ciliate near the margins of the basal half. Lip 28–32 mm. long and 6–7 mm. broad (apical lobe), linear-oblong and somewhat expanded and pandurate in the terminal third, caudate, with two extremely pubescent converging callus-ridges on the terminal third, the basal part densely pubescent and the remainder, except the glabrous apex, less pubescent, glabrous dorsally except at the base; terminal lobe oval or transversely rhombic; caudae about 5 mm. long, retrorse, fleshy but flattened.

Panama.

CHIRIQUÍ: vicinity of El Boquete, alt. 1000–1500 m., *Cornman 2050*; vicinity of Boquete, alt. 1200–1500 m., *Woodson & Schery 753*; in swampy meadows, Finca Lérica to Boquete, alt. about 1300–1700 m., *Woodson, Allen & Seibert 1148*.

Very few species of *Spiranthes* have rhizomes.

5. SPIRANTHES ACAULIS (J.E.Sm.) Cogn. in Mart. Fl. Bras. 3<sup>4</sup>:221. 1895.

*Neottia acaulis* J. E. Smith, Exot. Bot. 2:91, t. 105. 1806.

*Arethusa picta* Anders. in Trans. Soc. Arts. 25. 1807.

*Neottia picta* R. Br. in Ait. Hort. Kew. ed. 2, 5:199. 1813; Sims in Bot. Mag. 37: t. 1562. 1813.

*Sarcoglottis picta* Klotzsch in Allgem. Gartenz. 10:106. 1842; Schltr. in Beih. Bot. Centralbl. 37, Abt. 2:419. 1920.

*Gyrostachys picta* O. Ktze. Rev. Gen. 2:664. 1891.

*Sarcoglottis Hunteriana* Schltr. in Fedde Rep. Sp. Nov. Beih. 17:13. 1922.

*Sarcoglottis Powellii* Schltr. loc. cit. 14.

*Sarcoglottis Purpusiorum* Schltr. in Fedde Rep. Sp. Nov. 21:333. 1925.

Large terrestrial herbs with basal leaves or with the leaves withered at flowering time, up to 1 m. tall but more commonly 3–4 dm. tall. Leaves petiolate or epetiolate; lamina 6–18 cm. long and 4–7 cm. broad when mature, elliptic to oval to oblanceolate or obovate, acute or obtuse, membranaceous, mottled; petiole short or none. Inflorescence up to 2 dm. long, few–many-flowered; bracts up to 4 cm. long, linear to linear-lanceolate, acuminate. Dorsal sepal 15–22 mm. long and 3–4 mm. broad, ligulate, acute, pubescent dorsally. Lateral sepals 40–50 mm. long and 4–7 mm. broad, free part 18–28 mm. long, lanceolate, acute, arcuate, pubescent dorsally, basal part decurrent on the ovary and extending almost to the base. Petals 14–24 mm. long and 2–4 mm. broad, linear-lanceolate or usually



linear-oblongate, acute or obtuse, slightly arcuate, coherent to the dorsal sepal. Lip 30–40 mm. long and 7–11 mm. broad, essentially narrowly oblongate, obtuse, the dilated apical portion constricted and with an oval or suborbicular terminal lobe, disc pubescent below the constriction, bicaudate at the base, the caudae fleshy, retrorse.

From Mexico through Central America and the West Indies, in South America to northern Argentina.

CANAL ZONE: Culebra, *Pittier* 3427; near Panama City, San Juan, Manteca, Mata Redonda, Juan Diaz, Arias Hill, Frijoles, *Powell* 147, 179, 388, 389, 390, 391, 392, 394, 395, 398, 399, 3435, 3521, 3525, 3531, 3532, 3534, 3536, 3541, 3551, 3567, 3568, 3569, 3570.

Known in Panama only from the Canal Zone where it grows in fairly open situations. A variable species.

6. *SPIRANTHES SPECIOSA* (J. F. Gmel.) A. Rich. in *La Sagra*, *Hist. Isla Cub.* ed. 2, 11:252. 1850.

*Satyrium plantagineum* L. *Syst. Veg.* ed. 10, 1244. 1758-59, non *Spiranthes plantaginea* Lindl., Spreng. vel Torr.

*Serapias speciosa* J. F. Gmel. *Syst.* 59. 1791.

*Neottia speciosa* Jacq.  *Ic. Pl. Rar.* 3: t. 600. 1793; *Sims' Bot. Mag.* 33: t. 1374. 1811; *Hook. Exot. Fl.* 1: t. 3, 4. 1823.

*Stenorrhynchus speciosus* L. C. Rich. in *Mém. Mus. Par.* 4:59. 1818.

*Spiranthes colorata* N. E. Br. in *Gard. Chron.* n. s. 19:210. 1883.

Erect terrestrial or epiphytic herbs up to 4 dm. tall, with a rosette of basal leaves at flowering time. Leaves 4–18 cm. long and 1–8 cm. broad, elliptic to ovate or obovate, acute or acuminate; petioles 2–15 cm. long. Stems with several amplexicaul bracts. Inflorescence up to 10 cm. long, flowers congested; bracts up to 5 cm. long, linear-lanceolate, acuminate, usually red. Dorsal sepal 12–14 mm. long and 3–4 mm. broad, lanceolate, acute or acuminate, glabrous. Lateral sepals 12–15 mm. long and 3–4 mm. broad, lanceolate to narrowly lanceolate-triangular, acute or acuminate, forming a short mentum at the base. Petals 12–14 mm. long and 3–3.5 mm. broad, lanceolate or elliptic-lanceolate, somewhat arcuate, acute or acuminate, coherent to the dorsal sepal. Lip 13–15 mm. long and 4.5–5 mm. broad, terminal lobe lanceolate or oblong, acute, basal part oblong, pandurate, the basal margins somewhat thickened, disc pubescent.

Mexico, Guatemala, Honduras, Costa Rica, Panama, the West Indies, and in South America.

CHIRIQUÍ: vicinity of "New Switzerland," central valley of Río Chiriquí Viejo, alt. 1800–2000 m., *Allen* 1382; Salta Boquete, Boquete District, alt. 5500 feet, *Terry* 1267.

7. *SPIRANTHES NAVARRENSIS* (Ames) L. Wms. in *Ann. Missouri Bot. Gard.* 29:337. 1942.

*Stenorrhynchus navarrensis* Ames, *Sched. Orch.* 9:13, f. 3. 1925.

Erect or ascending terrestrial herbs up to about 5 dm. tall. Leaves basal, petiolate; lamina 7–16 cm. long and 3.5–8.5 cm. broad, narrowly to broadly



ovate, acuminate, membranaceous, often oblique; petiole 9–20 cm. long, winged and closed or sheathing at the base. Peduncle usually erect, with several membranaceous, sheathing bracts. Inflorescence up to 10 cm. long, few-many-flowered. Dorsal sepal 18–21 mm. long and 3.5–4.5 mm. broad, lanceolate, acute. Lateral sepals 18–22 mm. long and 3–4 mm. broad, lanceolate, more or less oblique. Petals 16–20 mm. long and about 2 mm. broad, linear-lanceolate, acute, subsigmoid, connate to the dorsal sepal. Lip 16–18 mm. long and 4–7 mm. broad, essentially lanceolate, constricted just above the base and again above the middle, auriculate at the base, the auricles fleshy. Anther up to 11 mm. long.

Costa Rica and Panama.

CHIRIQUÍ: cloud forest, Cerro Horqueta, alt. about 2000 m., *von Hagen & von Hagen 2111*.

Closely allied to *S. speciosa*.

8. SPIRANTHES ORCHIOIDES (Sw.) L. C. Rich. in *La Sagra, Hist. Isla Cuba*, ed. 2, 11:252. 1850.

*Satyrium orchioides* Sw. *Nov. Gen. & Sp. Prodr.* 118. 1788.

*Neottia orchioides* Sw. *Fl. Ind. Occ.* 3:1411. 1799; Sims in *Bot. Mag.* 25:t. 1036. 1807; Edwards' *Bot. Reg.* 9:t. 701. 1823.

*Stenorrhynchus orchioides* L. C. Rich. in *Mém. Mus. Par.* 4:59. 1818.

*Spiranthes jaliscana* S. Wats. in *Proc. Am. Acad.* 26:153. 1891.

*Stenorrhynchus jaliscana* Nash in *Bull. Torr. Bot. Club* 22:158. 1895.

Strict, leafless (at flowering time), terrestrial herbs up to 7 dm. tall but normally about 3 dm. tall. Leaves appearing after the flowering stage, 15–21 cm. long and 2.5–4 cm. broad, elliptic, membranaceous. Stems with several amplexicaul bracts which occasionally become leaf-like below. Sepals connivent or spreading at the tips, pubescent dorsally. Dorsal sepal 13–21 mm. long and 3–6 mm. broad, lanceolate, acute. Lateral sepals 18–27 mm. long and 3–4.5 mm. broad, lanceolate, acute, the bases decurrent on the ovary and at the base forming a protruded, acute or obtuse mentum. Petals 12–15 mm. long and 2.2–4.5 mm. broad, elliptic to elliptic-linear, acute or obtuse, coherent to the dorsal sepal. Lip 15–23 mm. long and 5.5–9 mm. broad, lanceolate, acute or acuminate, the margins of the broad claw fleshy and pubescent.

Florida and Mexico through Central America to Panama, the West Indies, and in South America to northern Argentina.

CANAL ZONE: Summit, alt. 75 m., *Allen 2453*; Bella Vista, Ceiba Tierra, Monte Lirio, near Gatún, La Chorrera, Tecúmen, Tapía, Mt. McComber, Mata Redonda, *Powell 386, 387, 393, 396, 402, 404, 407, 408, 409, 410, 414, 3454, 3527, 3547, 3557, 3559*.

The flowers of this species vary in color from white to brilliant red. In Panama they are often greenish. A widespread and variable species.

9. SPIRANTHES FUNCKIANA Rich. & Gal. in *Ann. Sci. Nat.* III, 3:32. 1845.

*Pelexia Pringlei* Fernald in *Proc. Am. Acad.* 35:562. 1900.

*Pelexia Funckiana* Schltr. in *Fedde Rep. Sp. Nov.* 15:197. 1918, as *P. Funkiana*; Ames & Schweinf. *Sched. Orch.* 8:3. 1925.





Fig. 79. *Spiranthes orchioides*



*Pelexia guatemalensis* Schltr. loc. cit. 197.

*Pelexia congesta* Ames & Schweinf. Sched. Orch. 10:5. 1930.

Slender terrestrial herbs up to 4.5 dm. tall. Leaves basal, petiolate; lamina 6–13 cm. long and 1.5–5 cm. broad, lanceolate to ovate, acute or acuminate, membranaceous; petiole 3–10 cm. long. Inflorescence up to 13 cm. long, several-many-flowered, lax or dense; bracts 1–3 cm. long, linear or linear-lanceolate, acuminate, somewhat pubescent dorsally. Dorsal sepal 14–19 mm. long and 4–5 mm. broad, oblanceolate, obtuse or acute, pubescent dorsally. Lateral sepals 25–35 mm. long and 3–3.5 mm. broad, linear-oblanceolate, acute, pubescent dorsally, oblique, free part strongly recurved, 14–18 mm. long, the basal part adnate to and decurrent on the ovary, 12–16 mm. long, forming a free spur-like projection at the base. Petals 14–19 mm. long and 2.5–3 mm. broad, linear-oblanceolate, acute or obtuse, coherent to the dorsal sepal. Lip 18–27 mm. long and 4–6.5 mm. broad, linear, subpandurate, with two retrorse auricles at the base, the disc puberulent toward the base.

Mexico, Guatemala, Honduras, Panama, and possibly South America.

COCLÉ: hills north of El Valle de Antón, vicinity of La Mesa, alt. about 1000 m., *Allen 2315*.

#### 14. ERYTHRODES Blume

ERYTHRODES Blume, *Bijdr. Fl. Nederl. Ind.* 410, *t.* 72. 1825.

*Physurus* L. C. Rich. in *Mém. Mus. Par.* 4:55. 1818, *nomen*.

Terrestrial herbs with semi-basal or cauline leaves. Sepals free, nearly equal, erect or spreading. Petals connate toward their apices and usually coherent to the dorsal sepal and with it forming a galea. Lip simple or lobed, slightly adnate to the column for a short way, extended into a simple or didymous spur at the base which usually contains four or more mammillate calli or callus-like structures at the base. Column short. Pollinia sectile or granular.

A genus found in the tropics and subtropics of both hemispheres. The species are difficult to interpret.

A single species recognized in Panama.

##### 1. ERYTHRODES KILLIPII Ames in *Proc. Biol. Soc. Wash.* 34:150. 1921.

Erect or ascending terrestrial herbs from a creeping rhizome, up to 1 m. or more long. Stems leafy toward the base, slender. Leaves petiolate; lamina 6–13 cm. long and 2–4.5 cm. broad, lanceolate to ovate or suborbicular, acuminate or acute, often oblique, membranaceous; petioles 2–5 cm. long, inflated and scarious at the base, semiamplexicaul. Sepals connate nearly to their apices. Dorsal sepal 5–7 mm. long and 2–3 mm. broad, lanceolate to oblong-lanceolate, obtuse or acute, pubescent dorsally. Lateral sepals 5.5–7 mm. long, 1.5–2.5 mm. broad, narrowly elliptic to oblong-lanceolate, obtuse or acutish, pubescent dorsally. Petals 5–6.5 mm. long and 1.5–2.5 mm. broad, oblanceolate, obtuse. Lip saccate; lamina



5–6.5 mm. long and 2.5–3.5 mm. broad, the basal part oblong, canaliculate, fleshy, the terminal lobe bi- or trilobulate, transverse, often ciliolate; sac 4–5 mm. long, obtuse, straight or curved slightly.

COCLÉ: vicinity of El Valle, alt. 1000 m., *Allen 1201* and *1792*. CHIRIQUÍ: Bajo Chorro, alt. 6000 feet, *Davidson 317*; valley of the Río Caldera from El Boquete to the Cordillera, alt. 1400–1600 m., *Killip 3561*.

More adequate material may show that the specimens from Coclé represent a different species.

#### 15. CORYMBORCHIS Thouars

CORYMBORCHIS Thouars, *Orch. Iles Afr. tt. 37, 38*. 1822.

*Corymbis* Thouars, loc. cit., is *Corymborchis* by elision.

Terrestrial herbs with plicate or subplicate leaves and often with branched stems. Sepals and petals connivent into a tube at the base, usually linear with the petals dilated at the apex. Lip canaliculate, erect from the base of the column and free from it, apex usually dilated and recurved. Column erect, slender, the apex clavate, bilobed; anther erect, acuminate, subequal to the rostellum; pollinia 2, granular.

The genus is pantropic, with two species in the western hemisphere.

1. CORYMBORCHIS FLAVA (Sw.) O. Ktze. *Rev. Gen. Pl.* 2:658. 1891.

*Serapias flava* Sw. *Nov. Gen. & Sp. Pl. Prodr.* 119. 1788.

*Corymbis flava* Hemsl. in *Godm. & Salv. Biol. Centr.-Am. Bot.* 3:297. 1884.

Tall, slender, terrestrial, leafy herbs up to 15 dm. tall. Stems up to about 6 mm. in diameter, covered with the leaf sheaths. Leaves when mature 25–45 cm. long and 3.5–7 cm. broad, elliptic or elliptic-lanceolate, acuminate, plicate, sessile or nearly so. Inflorescence a simple raceme or a panicle from the axils of the upper leaves, up to 13 cm. long; bracts up to 10 mm. long, ovate, acute. Dorsal sepal 13–15 mm. long and about 2.5 mm. broad, linear to linear-lanceolate, acute. Lateral sepals 13–15 mm. long and about 2 mm. broad, linear or linear-lanceolate, acute or arcuate. Petals 13–14 mm. long and about 4 mm. broad, oblanceolate, acute. Lip 12–15 mm. long and 4–7 mm. broad, lanceolate to ovate-lanceolate, acute, cucullate, with a callus ridge extending along the margins from the base up to the middle or beyond.

British Honduras, Salvador, Costa Rica, Panama, the West Indies, also in South America.

CHIRIQUÍ: llanos, on slope of Volcán de Chiriquí Viejo, alt. 1200 m., *Allen 1009*.

#### 16. STELIS Swartz

STELIS Swartz in *Schrader's Jour. f. Bot.* 2:239. 1799; in *Svenska Vet.-Akad. Handl.* 21:248. 1800, *nom. conserv.*



*Humboltia* Ruiz & Pavon, Fl. Peruv. et Chil. Prodr. 121, pl. 27. 1794, non Vahl.

Small to fairly large epiphytic herbs with caespitose or repent stems; secondary stems terminated by a single, usually fleshy, often petiolate leaf. Sepals subequal or the dorsal longest, more or less connate at the base, the laterals sometimes connate to their tips (*S. Allenii*). Petals much smaller than the sepals, broad, often flabellate, anterior margin usually thickened. Lip sessile, simple or 3-lobed, usually fleshy and about as long as the column. Column short, footless; stigmas confluent or separated. Anther terminal, operculate, incumbent, biloculate; pollinia 2, ceraceous.

A difficult genus to study because the petals and lip are usually very small and often extremely fleshy.

- a. Lateral sepals conspicuously shorter than the dorsal sepal, connate to the middle or beyond.
  - b. Lip ovate with the thick central callus concave in front..... 3. *S. DESPECTANS*
  - bb. Lip not ovate, without a thickened central callus.
    - c. Dorsal sepal more than 10 mm. long, lanceolate..... 1. *S. ALLENI*
    - cc. Dorsal sepal less than 5 mm. long, oblong..... 2. *S. INAEQUALIS*
- aa. Lateral sepals not conspicuously shorter than the dorsal sepal, connate only at their bases.
  - b. Lip up to more than twice as long as broad.
    - c. Dorsal sepal 3.5 mm. or more broad; leaves 3 cm. or more broad..... 5. *S. MONTANA*
    - cc. Dorsal sepal less than 3 mm. broad; leaves 2 cm. or less broad.
      - d. Sepals 4 mm. or more long, lanceolate-ovate to oblong-lanceolate, inner surface glandular..... 7. *S. SKUTCHII*
      - dd. Sepals 3 mm. or less long, triangular to orbicular.
        - e. Lip 1-1.5 mm. long; sepals triangular..... 6. *S. ATRORUBENS*
        - ee. Lip 0.5-0.6 mm. long; sepals ovate to orbicular..... 4. *S. MICROCHILA*
    - bb. Lip about as long as broad or broader than long.
      - c. Lip produced into an apicule or acumen in front.
        - d. Lip produced into a broad acumen, acumen not erect..... 8. *S. HYMENANTHA*
        - dd. Lip produced into an inconspicuous apicule (sometimes 3) or a fleshy erect apicule.
          - e. Apicule fleshy, erect..... 9. *S. CRESCENTICOLA*
          - ee. Apicule not fleshy, erect.
            - f. Sepals 2-4 mm. long, usually 3-nerved..... 11. *S. ENDRESII\**
            - ff. Sepals 4-9 mm. long, usually 5-nerved..... 10. *S. LEUCOPOGON\**
      - cc. Lip not produced into an apicule or acumen in front.
        - d. Callus of the lip cruciform; bracts on rachis prominent, acute or acuminate..... 12. *S. POWELLII*
        - dd. Callus of the lip not cruciform.
          - e. Callus of the lip longitudinal; lip with two minute auricles at the base; plants mostly less than 5 cm. tall..... 13. *S. STORKII*
          - ee. Callus of the lip transverse; lip without auricles at the base; plants mostly more than 5 cm. tall.
            - f. Inflorescence subequal to or shorter, or but slightly longer than the subtending leaves..... 14. *S. MAXONII*
            - .....and 15. *S. PANAMENSIS\*\**
          - ff. Inflorescence twice or more longer than the subtending leaves.
            - g. Secondary stems usually 3 cm. long or longer.
              - h. Sepals densely glandular-pubescent within..... 16. *S. VESTITA*
              - hh. Sepals not densely glandular-pubescent within, rarely pubescent..... 17. *S. AEMULA*
            - gg. Secondary stems 3 cm. or less long.
              - h. A callus-ridge running at right angles to the transverse callus toward base of lip..... 18. *S. COLLINA*





Fig. 80. *Stelis Allenii*



- hh. No callus-ridge running at right angles to the transverse callus.  
 i. Sepals 3.5–4.5 mm. long..... 19. *S. WILLIAMSH*  
 ii. Sepals 1.5–2.5 mm. long.  
     j. Bracts of the inflorescence almost contiguous..... 17. *S. AEMULA*  
     jj. Bracts of the inflorescence well separated..... 20. *S. LONGIPETIOLATA*

\* These two species appear somewhat different but perhaps are not distinct.

\*\* *S. panamensis* would seem to key out here also, but the material available is so scanty that it can not be properly placed.

1. *STELIS ALLENII* L. Wms. in Ann. Missouri Bot. Gard. 29:338. 1942.

Large caespitose epiphytic herbs up to 4 dm. tall. Secondary stems 7–15 cm. long and 0.25–0.35 cm. in diameter, covered with two or three loose sheaths which soon disintegrate, shorter than the leaves. Leaves 10–19 cm. long and 3.5–7 cm. broad, elliptic to elliptic-oval, acute or obtuse, coriaceous, attenuated into a short petiole at the base. Inflorescence up to 30 cm. long, floriferous to the base, one or more borne from the apex of the stems (if more than one then presumably borne in different years); sheaths up to 2.5 cm. long, cucullate, ample; bracts 2–18 mm. long, reduced upwards, ovate-lanceolate, acute or acuminate, infundibuliform; flowers largest of the genus. Dorsal sepal 14–16 mm. long and 5–6 mm. broad, lanceolate, acute, 11–13-nerved, cucullate. Lateral sepals connate to their apices, together 10–12 mm. long and 8–10 mm. broad, suborbicular-ovate, acute or obtuse, cucullate and gibbous at the base, many-nerved. Petals about 1 mm. long and 1.5 mm. broad, broadly flabellate to transversely oval, the apex much thickened. Lip 0.75–1 mm. long and 1–1.4 mm. broad, about 0.75 mm. thick at the apex, flabellate, truncate, the transverse callus at the apex of the lip, very like the petals but slightly smaller.

Endemic in Panama.

COCLÉ: hills north of El Valle de Antón, alt. 800 m., *Allen 2952*.

*Stelis Allenii* is perhaps the most distinctive species of the genus in Central America and seems to be the largest-flowered. There are no near allies in Central America but the species seems to belong to Lindley's section *DIALISSA*, a section with but a few species in the Andes.

2. *STELIS INAEQUALIS* Ames, Sched. Orch. 4:12. 1923; in Bot. Mus. Leafl. Harv. Univ. 3:155, *t.* 1935.

Small, caespitose, epiphytic herbs up to about 5 cm. tall. Secondary stems about 3 mm. long, concealed by the sheathing bracts. Leaves 1.5–2.5 cm. long and 0.4–0.5 cm. broad, oblanceolate, obtuse, emarginate, coriaceous. Inflorescence up to 5 cm. long, exceeding the leaves; bracts about 1 mm. long, infundibuliform. Dorsal sepal 2–2.5 mm. long and 1–1.4 mm. broad, elliptic-oblong, obtuse, puberulent ventrally. Lateral sepals 1–1.4 mm. long and together 1.6–2 mm. broad, connate to beyond the middle. Petals 0.5–0.75 mm. long and 0.75–1 mm. broad, flabellate. Lip 0.6–0.75 mm. long and about 0.35–0.5 mm. broad, rather thin below the middle and much thickened above, strongly concave in front of the obtuse apex.



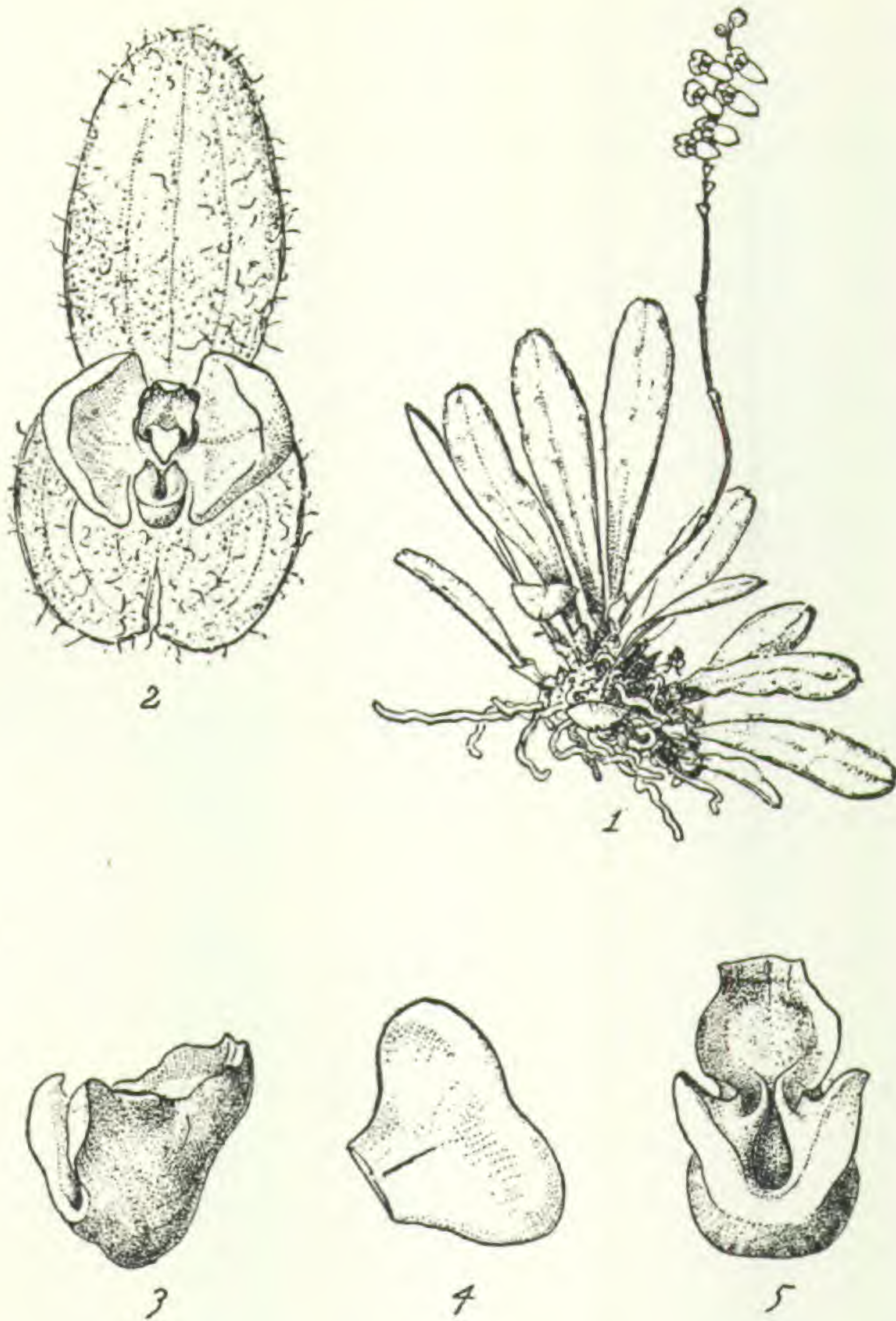
**STELIS***inaequalis* Ames

Fig. 81

mm. broad, ovate, acute or obtuse. Petals 0.5–0.7 mm. long and 0.4–0.5 mm. broad, suborbicular, apex truncate and thickened. Lip 0.6–0.75 mm. long and 0.3–0.6 mm. broad, rhombic to broadly ovate, thickened, excavate and concave in front, the basal half much thickened and the callus submammillate.

Costa Rica and Panama.

CHIRIQUÍ: between Alto de las Palmas and Cerro Horqueta, alt. 2100–2268 m., Pittier 3228.

The specimen cited is the largest known for the species and the maximum measurements apply to it.

4. *STELIS MICROCHILA* Schltr. in Fedde Rep. Sp. Nov. 9:289. 1911.

*Stelis barbata* Rolfe in Kew Bull. 1913: 141. 1913.

*Stelis costaricensis* Schltr. in Beih. Bot. Centralbl. 36, Abt. 2:388. 1918.

*Stelis cinerea* Schltr. loc. cit. 444.

*Stelis bryophila* Schltr. in Fedde Rep. Sp. Nov. Beih. 19:16. 1923.

Small, caespitose, epiphytic herbs up to about 15 cm. tall. Secondary stems

Honduras and Panama.

PANAMÁ: foothills, upper reaches of Chagres River near San Juan, alt. near sea-level, Powell 271.

3. *STELIS DESPECTANS* Schltr. in Fedde Rep. Sp. Nov. 8:453. 1910.

*Stelis chiriquensis* Schltr. in Beih. Bot. Centralbl. 36, Abt. 2:386. 1918.

*Stelis nutantiflora* Schltr. loc. cit. 390.

Caespitose epiphytic herbs up to about 25 cm. tall. Secondary stems 2–12 cm. long, about as long as or shorter than the leaves. Leaves narrowed to a petiole at the base; lamina 2–12 cm. long and 2–7 mm. broad, linear-elliptic or linear-oblong; petiole up to 4 cm. long, slender. Inflorescence about as long as or exceeding the leaves in length. Sepals connate at the base for a short distance; dorsal sepal 2–3 mm. long and 0.75–1.5 mm. broad, lanceolate-oblong to obovate-oblong, acute or obtuse; lateral sepals 1.7–2.5 mm. long and 1.2–1.5



up to about 2 cm. long, covered with one or more loose sheaths. Leaves 2–6 cm. long and 0.2–0.8 cm. broad, narrowly to broadly oblanceolate, obtuse or acute, attenuated into a narrow petiole at the base. Sepals connate for a short distance at the base, puberulent within and sometimes dorsally; dorsal sepal 1.5–2 mm. long and 1.3–1.5 mm. broad, ovate to suborbicular, obtuse or acutish; lateral sepals 1.2–1.5 mm. long and 1.1–1.3 mm. broad, broadly ovate. Petals about 0.75 mm. long and 0.75–1.1 mm. broad, transversely oblong or subquadrate, the truncate terminal margin thickened. Lip 0.5–0.6 mm. long and 0.25–0.4 mm. broad; basal  $\frac{1}{2}$  or  $\frac{2}{3}$  very fleshy, with two more or less longitudinal calluses or thickenings which have a distinct sinus; terminal lobe oblong or subquadrate, obtuse, cochleate, relatively thin.

Guatemala, Costa Rica, and Panama.

COCLÉ: mountains beyond La Pintada, alt. 400–600 m., *Hunter & Allen 590*.

5. *STELIS MONTANA* L. Wms. in *Ann. Missouri Bot. Gard.* 27:272. 1940; loc. cit. 29:340, *t.* 32, *figs.* 9–12. 1942.

Caespitose epiphytic herbs up to about 33 cm. tall. Secondary stems 11–13 cm. long, covered with the sheathing cauline bracts, shorter than the leaves. Leaves 17–20 cm. long and 3–3.5 cm. broad, oblanceolate, obtuse, coriaceous, gradually narrowed into a short petiole. Inflorescence racemose, as long as or longer than the subtending leaves. Sepals connate for a short distance at their bases. Dorsal sepal about 6 mm. long and 3.5 mm. broad, ovate to lanceolate-ovate, acute, apiculate. Lateral sepals about 5 mm. long and 4.5 mm. broad, broadly ovate, somewhat oblique, acute, apiculate. Petals about 1.5 mm. long and 1.5 mm. broad, nearly orbicular, the apex thickened. Lip about 2–2.25 mm. long and 0.8–1 mm. broad, oblong to oblong-obovate, obscurely 3-lobed, the basal half filled with a large callus, the terminal part thin, minutely puberulent dorsally.

Endemic to Panama.

CHIRIQUÍ: trail from Cerro Punta to headwaters of Río Caldera, alt. 2250–2500 m., *Allen 1463*.

6. *STELIS ATRORUBENS* L. Wms. in *Ann. Missouri Bot. Gard.* 29:239. 1942.

Small, caespitose, epiphytic herbs up to about 18 cm. tall. Secondary stems 1.5–3.5 cm. long, slender, covered with bracts. Leaves 6–9 cm. long, petiolate, much longer than the secondary stems; lamina about 4–6.5 cm. long and 0.5–1 cm. broad, elliptic to elliptic-oblanceolate, obtuse, fleshy; petiole 2–3 cm. long. Inflorescence up to 15 cm. long, upper half more or less densely flowered; bracts about 2 mm. long, infundibuliform, acute, scarious. Sepals connate at the base, rotate, 2–2.5 mm. long and 1.5–2 mm. broad, triangular, acute, 3-nerved. Petals about 0.75 mm. long and 0.75 mm. broad, suborbicular, 1-nerved, the terminal part thickened, fleshy. Lip 1–1.5 mm. long and 0.5–0.6 mm. broad, obscurely 3-lobed, oblong or oblong-oval, basal part of the lip oblong, somewhat concave, fleshy, terminating into two small, suberect lateral lobes, terminal lobe of the lip about 0.5 mm. long, suborbicular, strongly concave, fleshy.



Fig. 82. *Stelis atrorubens*

Endemic to Panama.

COCLÉ: vicinity of El Valle, alt. 600–1000 m., *Allen 1234*; hills north of El Valle de Antón, trail to Las Minas, *Allen 2876*.

Allied to the preceding and the following species.

7. *STELIS SKUTCHII* Ames in Bot. Mus. Leafl. Harv. Univ. 6:17, *t.* 1938.

Caespitose epiphytic herbs up to 3 dm. tall. Secondary stems 6–10 cm. long, slender, covered with scarious sheaths. Leaves petiolate; lamina 5–12 cm. long and 0.8–2 cm. broad, elliptic, obtuse or acutish; petioles 2–4 cm. long, sulcate. Inflorescence up to 22 cm. long, exceeding the subtending leaf; bracts about 2 mm. long, infundibuliform. Sepals connate at the base, papilliferous within; dorsal sepal about 6 mm. long and 2 mm. broad, lanceolate-ovate, apiculate; lateral sepals about 4.5 mm. long and 2 mm. broad, ovate-lanceolate, slightly oblique. Petals about 1 mm. long and about 1.3 mm. broad, flabellate, callus-thickened toward the truncate apex. Lip about 1 mm. long and 0.5 mm. broad, linguiform, with an erect but obscure lobule on each side near the middle, callus-thickened below, terminal part slightly concave above and slightly narrower than the basal portion.

Costa Rica and Panama.

CHIRIQUÍ: Bajo Chorro, Boquete District, alt. 6000 feet, *Davidson 270*.





Fig. 83. *Stelis Skutchii*



8. *STELIS HYMENANTHA* Schltr. in Fedde Rep. Sp. Nov. 10. 291. 1912.

*Stelis cuspidilabia* Schltr. in Fedde Rep. Sp. Nov. Beih. 19:17. 1923.

*Stelis seleniglossa* Schltr. loc. cit. 97.

Small, caespitose, epiphytic herbs up to about 20 cm. long. Secondary stems 1–5 cm. long, shorter than the leaves. Leaves 4–10 cm. long and 0.2–1 cm. broad, linear, ligulate to oblanceolate, obtuse or acute, coriaceous. Inflorescence up to 13 cm. long, longer than or subequal to the subtending leaves. Sepals 1–1.4 mm. long and 0.75–1.2 mm. broad, broadly oval to suborbicular, obtuse or acute, free almost to their bases. Petals about 0.5 mm. long and 0.25–0.3 mm. broad, oblong, truncate, apex thickened. Lip 0.5–0.7 mm. long and about 0.4 mm. broad, subquadrate to suborbicular-ovate, the apex produced into a broad, acute or acuminate apicule about  $\frac{1}{3}$  the length of the lip, disc provided with a bipartite callus on the basal half.

Mexico, Guatemala, Costa Rica and Panama.

CHIRIQUÍ: Bajo Chorro, alt. 6000 feet, *Terry 1286*.

9. *STELIS CRESCENTICOLA* Schltr. in Fedde Rep. Sp. Nov. 16:442. 1920; Ames, Sched. Orch. 5:11. 1923; Ames in Bot. Mus. Leaf. Harv. Univ. 3:175, t. 1935.

*Stelis flexuosa* Lindl., sensu Kränzl., in Engl. Bot. Jahrb. 26:450. 1899.

*Stelis Isthmii* Schltr. in Fedde Rep. Sp. Nov. Beih. 17:16. 1922.

*Stelis praemorsa* Schltr. loc. cit. 17.

Small, caespitose, epiphytic herbs up to 20 cm. tall. Secondary stems 1–2 cm. long, slender, much shorter than the leaves. Leaves 4–9.5 cm. long and 0.5–1 cm. broad, oblanceolate, acute or obtuse, attenuated into a petiole at the base, coriaceous. Inflorescence up to about 18 cm. long, much exceeding the leaves, raceme densely flowered; bracts 1–2 mm. long, infundibuliform. Sepals 1–1.5 mm. long and 1–1.5 mm. broad, suborbicular to subrhombic-ovate, acute or obtuse, papilliferous within. Petals about 0.5 mm. long and about 0.75 mm. broad, flabellate, not thickened at the apex. Lip about 0.5 mm. long and 0.5 mm. broad and nearly as thick, rhombic-ovate, with a transverse callus through the middle and the short apex incurved.

Costa Rica and Panama.

CANAL ZONE (?): in tidal belt, *Pittier 6595*. PANAMÁ: Río Chagres, *Lehmann 4540*; hills east of [Panamá] City and San Juan, all near sea-level, *Powell 232, 234, 284, 285, 3312, 3313, 3314, 3522*.

The smallest-flowered of the Panamanian species.

10. *STELIS LEUCOPOGON* Reichb. f. Beitr. Orch. Centr.-Am. 95, t. 9, figs. 1, 1-4. 1866.

*Stelis cascajalensis* Ames, Sched. Orch. 4:11. 1923.

*Stelis eximia* Ames, loc. cit. 6:54. 1923.





Fig. 84



Caespitose epiphytic herbs up to about 40 cm. tall. Secondary stems 2–15 cm. long, either longer or shorter than the leaves. Leaves 6–15 cm. long and 1–4.5 cm. broad, ligulate, oblanceolate to narrowly oval, acute or obtuse, coriaceous, attenuated into a petiole at the base. Inflorescence up to 30 cm. long, one or more from the apex of each secondary stem, subequal to usually much exceeding the leaves in length. Sepals 4–9 mm. long and 4–8 mm. broad, broadly ovate-triangular to suborbicular, acute or obtuse, puberulent or glabrous within, usually 5-nerved. Petals 0.75–1.3 mm. long and 1.75–2.2 mm. broad, flabellate, truncate apex very fleshy. Lip 0.5–1 mm. long and 0.7–1.2 mm. broad, transversely oblong to suborbicular-quadrate, apiculate or triapiculate at the apex, disc very fleshy, the callus more or less transverse.

Costa Rica and Panama; possibly also in South America.

CHIRIQUÍ: vicinity of Bajo Chorro, alt. 1900 m., *Woodson & Schery 624*; "Caramilla," alt. 4000–6000 feet, *Powell 312, 334*. COCLÉ: hills north of El Valle de Antón, alt. 1000 m., *Allen 2173*; vicinity of La Mesa, north of El Valle de Antón, alt. about 1000 m., *Allen 2301*; north rim, El Valle de Antón, *Alston & Allen 1840*.

A variable species which may include *Stelis Endresii* Reichb. f. The specimens from Coclé differ somewhat from the others in having a triapiculate apex on the lip.

11. *STELIS ENDRESII* Reichb. f. in *Gard. Chron.* 1373. 1870; Ames in *Bot. Mus. Leaf. Harv. Univ.* 1<sup>9</sup>: fig. p. 9. 1933.

*Stelis parvibracteata* Ames, *Orch.* 7:131. 1922.

Small, caespitose, epiphytic herbs up to 22 cm. tall. Secondary stems 1.5–5 cm. long, slender, shorter than the leaves. Leaves 4–13 cm. long and 0.5–2 cm. broad, elliptic to oblanceolate, obtuse or acute, attenuated into a petiole at the base. Inflorescence up to 18 cm. long, floriferous to the middle or below, much exceeding the leaves, 1 or more from a stem; bracts 1–2 mm. long, infundibuliform. Sepals 2–4 mm. long and 2–5 mm. broad, suborbicular to subtriangular, acute or obtuse, glabrous to puberulent within, 2-(or rarely 5-) nerved. Petals 0.75–1 mm. long and 1–1.5 mm. broad, flabellate, truncate, apical part thickened and fleshy. Lip about 0.75 long and 1 mm. broad, transversely oval, with a small, erect apicule at the apex.

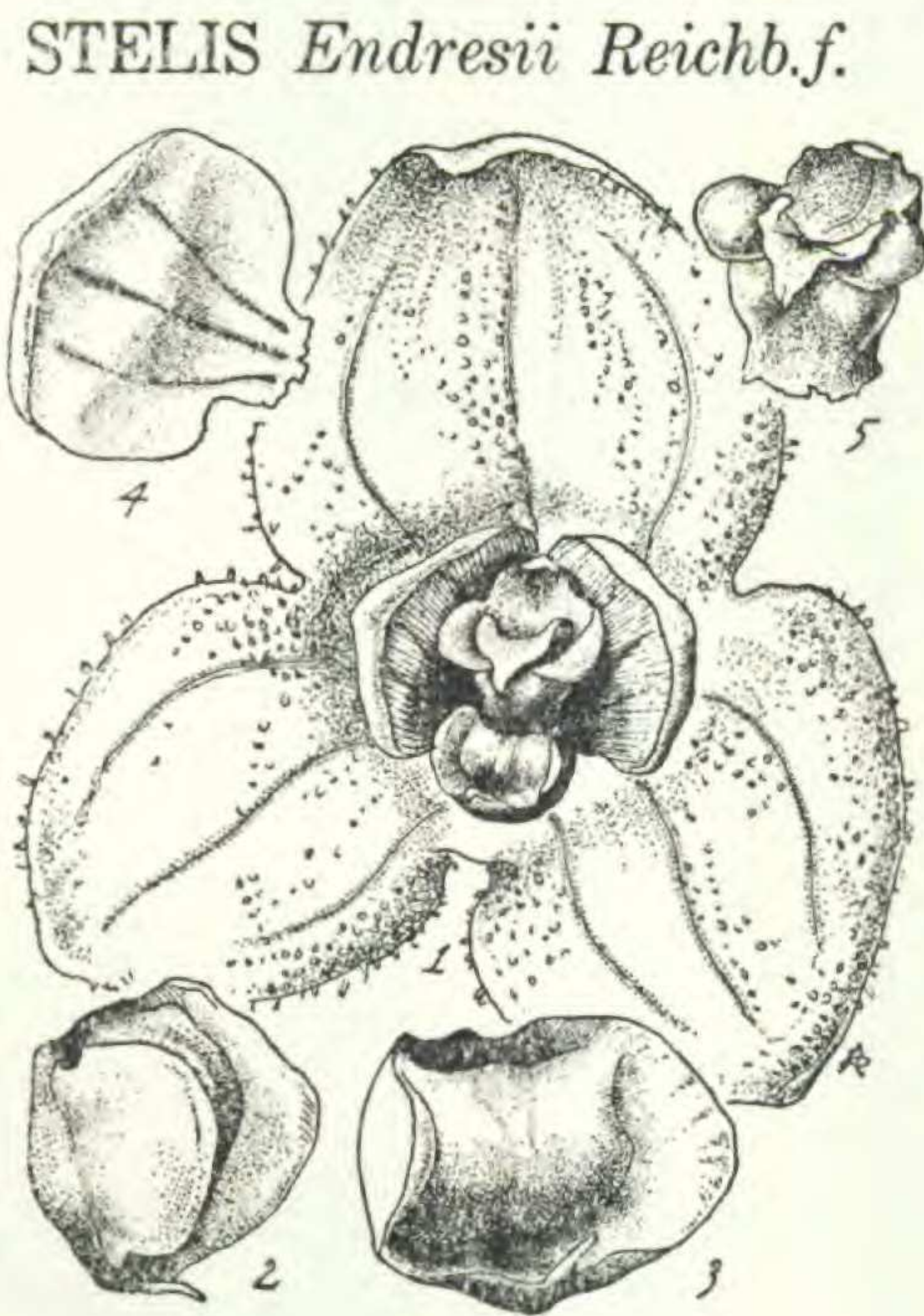


Fig. 85

Mexico, Guatemala, Costa Rica and



Panama, possibly also in South America.

DARIÉN: Cana and vicinity, alt. 6000 feet, *Williams 972*. COCLÉ: hills north of El Valle de Antón, alt. 800–1000 m., *Allen 2273*.

Critical work on the genus may prove this species to be the same as *S. leucopogon* Reichb. f.

12. *STELIS POWELLII* Schltr. in Fedde Rep. Sp. Nov. Beih. 17:16. 1922; Ames in Bot. Mus. Leafl. Harv. Univ. 1<sup>9</sup>: fig. p. 9. 1933.

*STELIS Powellii* Schltr.

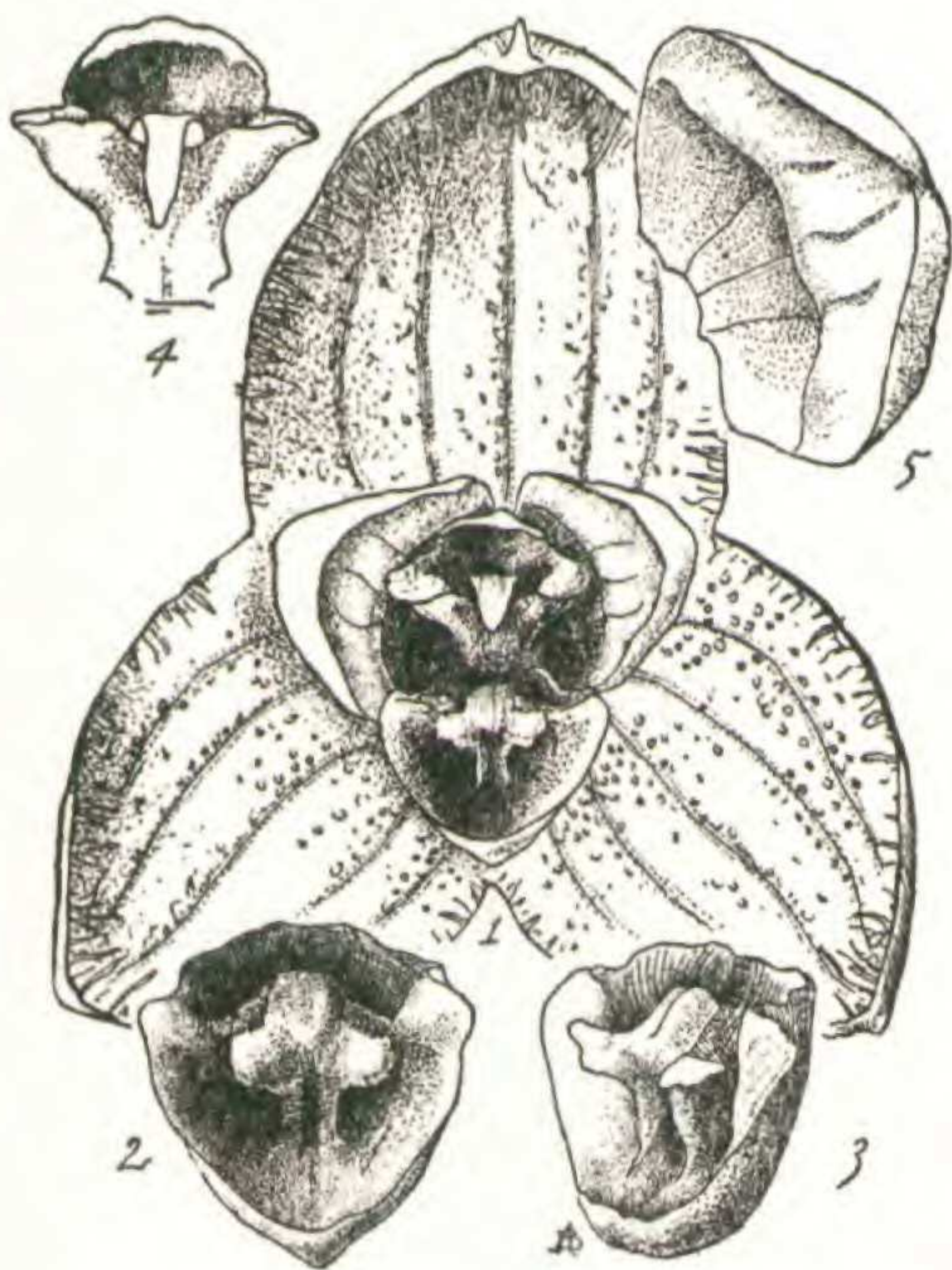


Fig. 86

Small, caespitose, epiphytic herbs up to 15 cm. tall. Secondary stems 1–3 cm. long, shorter than the leaves. Leaves attenuated into a petiole at the base; lamina 2–7 cm. long and 0.5–1.5 cm. broad, oblanceolate to ligulate-oblanceolate, obtuse; petiole up to 3 cm. long. Inflorescence longer than the leaves; bracts 2–4 mm. long, ovate, acute, large and conspicuous for the genus, infundibuliform. Sepals 2.5–3 mm. long and 3–3.5 mm. broad, connate for a short distance at the base, suborbicular to ovate-suborbicular or ovate-triangular, obtuse, 5-nerved, puberulent or papillose within. Petals 1–1.5 mm. long and 1.5–2 mm. broad, flabellate, subtruncate and thickened terminally. Lip 1.2–1.5 mm. long and 0.75–1.2 mm. broad, ovate, concave, relatively thin with a cruciform callus in the middle.

Costa Rica and Panama.

CHIRIQUÍ: alt. 4000 feet, *Powell 247*.

Conspicuous among Panamanian species by the relatively conspicuous bracts.

13. *STELIS STORKII* Ames in Bot. Mus. Leafl. Harv. Univ. 3:54, fig. 1935; L. Wms. in Ann. Missouri Bot. Gard. 27:273. 1940.

Small, caespitose, epiphytic herbs up to 6 cm. tall. Secondary stems 1–2 cm. long, covered with sheathing bracts, shorter than the leaves. Leaves 1–4 cm. long and 0.25–0.5 cm. broad, oblanceolate, acute or obtuse, inconspicuously marginate, longer than the secondary stems, equal to or usually shorter than the inflorescence. Inflorescence up to about 4 cm. long; bracts 1–1.5 mm. long, infundibuliform, apiculate. Sepals connate for a short distance at their bases, 1–1.3 mm. long and 1–1.3 mm. broad, nearly orbicular, obtuse, 3-nerved. Petals 0.5–0.75 mm. long and about 0.6 mm. broad, broadly obovate or cuneate.



flabellate, slightly cochleate, the apex thickened. Lip about 0.5–0.75 mm. long and as broad, nearly orbicular, fleshy, with a large central callus extending through the middle of the lamina and prominently raised at the base.

Costa Rica and Panama.

COCLÉ: vicinity of El Valle, alt. 800–1000 m., *Allen 1828*.

14. *STELIS MAXONII* Schltr. in *Beih. Bot. Centralbl.* 36, Abt. 2:389. 1918.

Caespitose epiphytic herbs up to 40 cm. tall. Secondary stems up to 23 cm. long, slender. Leaves 9–15 cm. long and 1–2.7 cm. broad, elliptic to lanceolate, obtuse, coriaceous, attenuated into a short petiole at the base. Inflorescence up to about 15 cm. long, subequal to the leaves; bracts about 3 mm. long, infundibuliform, acute or shortly acuminate. Sepals 2–3 mm. long and 2.2–3.5 mm. broad, suborbicular. Petals about 1 mm. long and 1 mm. broad, suborbicular, flabellate, the terminal part thickened and fleshy. Lip about 1.2 mm. long and 1 mm. broad, broadly oval in outline, with a transverse callus across the middle of the lip, the lip fleshy.

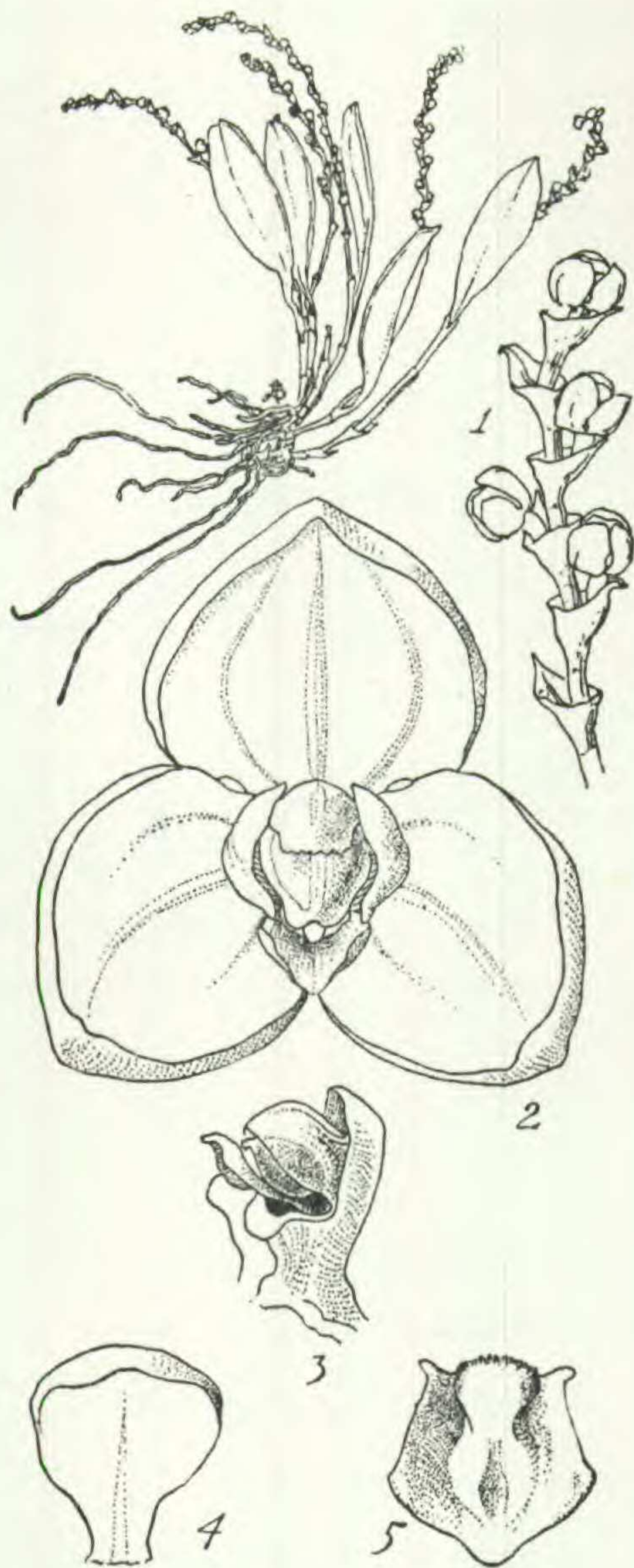
Costa Rica and Panama.

CHIRIQUÍ: Volcán de Chiriquí, alt. 10,000 feet, *Davidson 988*; above El Boquete, alt. 1450–1650 m., *Maxon 5697*; southern slope of La Horqueta, alt. 1700–2100 m., *Pittier 3242*.

Closely allied to *S. thecoglossa* Reichb. f. with which it has been placed.

15. *STELIS PANAMENSIS* Schltr. in *Beih. Bot. Centralbl.* 37, Abt. 2:391. 1918.

Erect epiphytic herbs up to 18 cm. tall. Secondary stems 2–3 cm. long, much shorter than the leaves. Leaves 8–10 cm. long and 0.8–1 cm. broad, oblanceolate-ligulate, obtuse, narrowed to a petiole at the base. Inflorescence equal to the leaves or shorter; bracts cucullate. Sepals broadly ovate, obtuse; dorsal sepal about 2.5 mm. long; the lateral sepals distinctly smaller, oblique. Petals broadly rhombic-reniform, oblique, obtuse, apex thickened. Lip subequal to the petals, reniform, obtuse, excavated at the base and the middle with a transverse callus.



*STELIS Storkii* Ames

Fig. 87



Panama.

PANAMÁ: forests of the upper Mamoni River, alt. 150–400 m., *Pittier 4490*.

This species is known to us only by the description and an analysis of the type.

*STELIS vestita* Ames

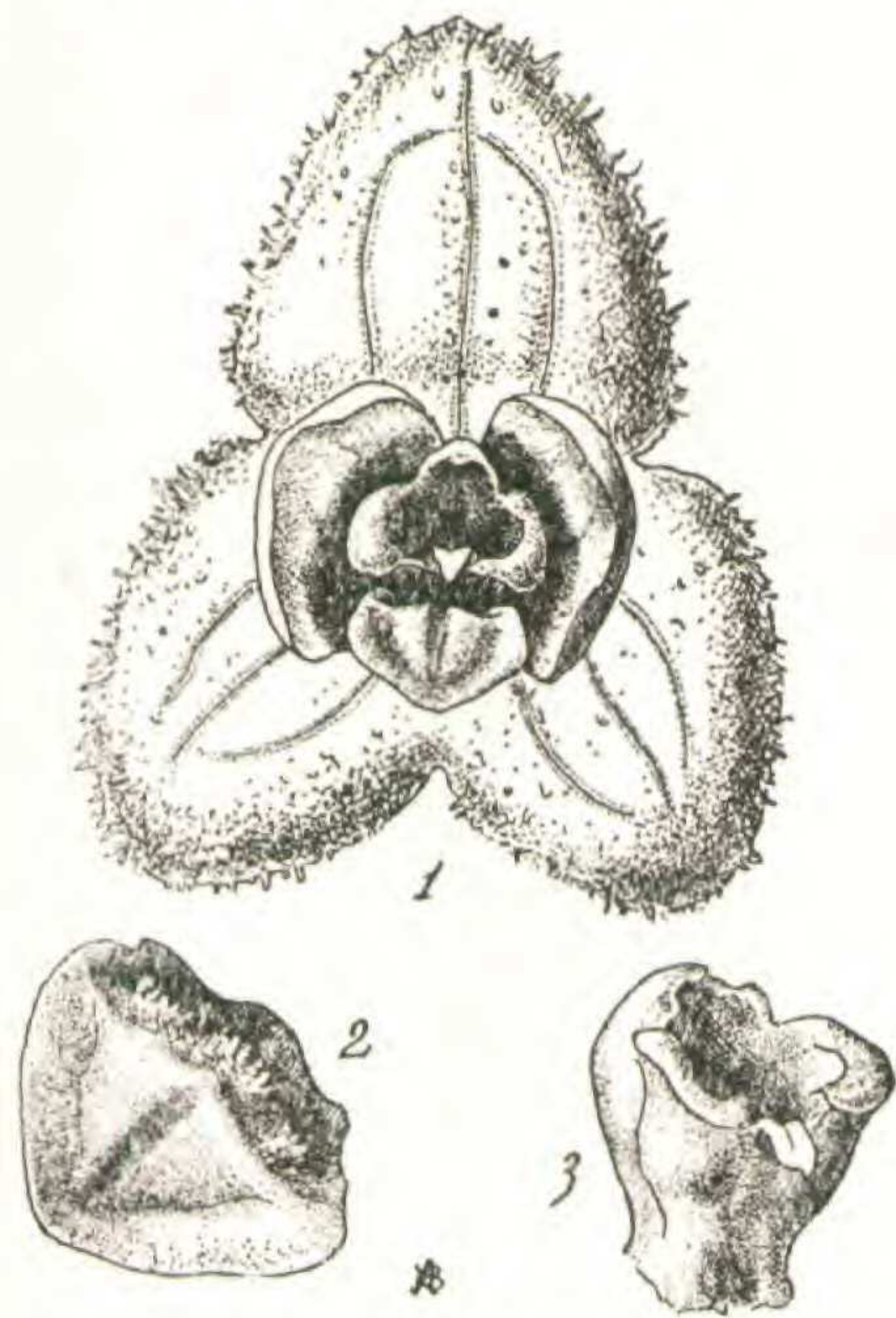


Fig. 88

16. *STELIS VESTITA* Ames, Sched. Orch. 6:56. 1923; in Bot. Mus. Leaflet Harv. Univ. 1<sup>9</sup>: fig. p. 9. 1933.

Caespitose epiphytic herbs up to 45 cm. tall. Secondary stems 4–10 cm. long, subequal or shorter than the leaves. Leaves 5–16 cm. long and 1–2 cm. broad, elliptic-oblong to oblanceolate, attenuated into a petiole at the base, coriaceous. Inflorescence up to about 35 cm. long, much longer than the subtending leaf; bracts 2–3 mm. long, infundibuliform. Sepals 2–2.5 mm. long and 2–2.3 mm. broad, ovate to suborbicular, obtuse, densely glandular-pubescent within. Petals 0.8–1 mm. long and 1.5–1.75 mm. broad, cuneate-flabellate, fleshy, truncate. Lip 0.8–1 mm. long and 1–1.2 mm. broad, suborbicular or transversely subrhombic,

callus-thickened in the middle and the basal part with a smaller spongy callus, the margins of the lip thin.

Costa Rica and Panama.

CHIRIQUÍ: Boquete, alt. 4000 feet, *Davidson 696*.

Allied to *S. Endresii* Reichb. f. and to *S. leucopogon* Reichb. f.

17. *STELIS AEMULA* Schltr. in Beih. Bot. Centralbl. 36, Abt. 2:385. 1918.

*Stelis sarcodantha* Schltr. loc. cit. 392.

Small, caespitose, epiphytic herbs up to about 2.5 cm. tall. Secondary stems 1.5–7.5 cm. long, slender, shorter than the leaves. Leaves 4–11.5 cm. long and 0.5–1.3 cm. broad, ligulate to oblanceolate, obtuse or acute, coriaceous, attenuate at the base into a petiole. Inflorescence up to 20 cm. long (in Panama mostly 12 cm. or less), much exceeding the leaves; bracts 1–2 mm. long, infundibuliform. Sepals 1.5–2.2 mm. long and 1.75–2.5 mm. broad, broadly ovate-orbicular or suborbicular, obtuse or acutish, marginate or the margins obscurely involute, puberulent or glabrous within. Petals 0.5–0.6 mm. long and 0.6–1 mm. broad, oblong to flabellate, the apex thickened. Lip 0.5–0.75 mm. long and 0.6–1 mm. broad, suborbicular, obtuse, with a transverse callus in the middle, margins not thickened.



(Guatemala, Honduras — *S. perplexa* Ames)?, Costa Rica, and Panama.

CHIRIQUÍ: Palo Alto, alt. 4500–5000 feet, *Powell* 290, 291, 293, 294. COCLÉ: hills north of El Valle de Antón, alt. 1000 m., *Allen* 2154, 2157.

18. *STELIS COLLINA* Schltr. in Fedde Rep. Sp. Nov. Beih. 17:15. 1922.

Small, caespitose, epiphytic herbs up to 28 cm. long. Secondary stems up to 3 cm. long, slender. Leaves 3–10 cm. long and 0.7–1.2 cm. broad, oblanceolate-ligulate, obtuse, attenuated into a petiole at the base. Inflorescence elongated, much exceeding the leaves; bracts about 2 mm. long, infundibuliform. Sepals 3–3.5 mm. long and 3–3.5 mm. broad, triangular-ovate, obtuse, 3-nerved. Petals about 1 mm. long and 1.5 mm. broad, flabellate, truncate apex thickened. Lip about 0.8 mm. long and 1 mm. broad, suborbicular, obtuse, with a transverse raised callus in the middle, the basal half with two lateral cavities and a small longitudinal ridge between them.

Panama.

PANAMÁ: foot-hills near [Panamá] City, near sea-level, *Powell* 180.

Formerly referred to *S. Williamsii* Ames, but probably distinct, though closely allied.

19. *STELIS WILLIAMSHII* Ames, Orch. 7:133. 1922.

Small, caespitose, epiphytic herbs up to 25 cm. tall. Secondary stems about 1.5 cm. long. Leaves 4–10 cm. long and 0.6–1.1 cm. broad, attenuated into a short petiole at the base, oblanceolate-ligulate. Inflorescence up to 23 cm. long, much exceeding the leaves; bracts 2–5 mm. long, infundibuliform, free part triangular-lanceolate or broadly ovate, acute or acuminate. Sepals about 3.5–4.5 mm. long and as broad, suborbicular, obtuse. Petals about 1.5 mm. long and 1.7 mm. broad, cuneate-flabellate. Lip about 1 mm. long and 1.2 mm. broad, trulliform, obtuse, with a raised transverse callus.

Panama.

DARIÉN: Cana and vicinity, alt. 6000 feet, *Williams* 970.

Has been confused with *S. collina* Schltr., a closely allied sea-level species.

20. *STELIS LONGIPETIOLATA* Ames, Sched. Orch. 1:6. 1922.

Small, caespitose, epiphytic herbs up to 10 cm. tall. Leaves 4.5–8 cm. long and 0.7–1.1 cm. broad, elliptic, petiolate, the lamina up to 5.5 cm. long. Secondary stems 1.5–2.5 cm. long, slender, much shorter than the leaves. Inflorescence about equalling the leaves in length; bracts about 1.5 mm. long, infundibuliform. Sepals 2–2.5 mm. long, rotate, deltoid-ovate. Petals about 1 mm. long, ovate to suborbicular, thickened nearly to the base, abruptly excavated below the thickening, apex obscurely and minutely papillose. Lip about 0.75 mm. long and 1.5 mm. broad, reniform, very fleshy, somewhat concave above with a prominent and obscurely bilobed callus in the middle, the sides of which are decurrent laterally



and form a transverse ridge.

Panama.

CHIRIQUI: humid forest between Alto de las Palmas and Cerro de la Horqueta, alt. 2100–2200 m., *Maxon 5460*.

#### 17. PHYSOSIPHON Lindl.

PHYSOSIPHON Lindl. in Bot. Reg. 21: sub *t.* 1797. 1836.

Small, caespitose, epiphytic herbs. Secondary stems slender, terminated by a single leaf. Sepals connate at the base into an (usually) inflated tube, free above, erect or spreading, not caudate. Petals very small in comparison to the sepals. Lip small, articulated to the column-foot, entire or three-lobed. Anther terminal, incumbent, operculate; pollinia 2, ceraceous.

A small genus of rather diverse species, of which the Panama one is not typical of the genus.

1. PHYSOSIPHON MINUTIFLORUS Ames & Schweinf. Sched. Orch. 8:11, *t.* 22, *figs.* 1-6 and *habit.* 1925.

Small caespitose epiphytic herbs up to 30 cm. tall. Secondary stems 2–10 cm. long, invested by 2–3 loose sheaths. Leaves 3.5–12 cm. long and 0.5–1.5 cm. broad, oblong-ligulate, coriaceous, attenuated at the base into a petiole. Inflorescence up to 25 cm. long, equalling or exceeding the leaves, densely flowered almost to the base; bracts 2–3 mm. long, infundibuliform. Sepals connate into a short tube at the base, 2–3 mm. long and about 0.6–0.8 mm. broad, free portion ovate-lanceolate, acute or obtuse. Petals about 0.75 mm. long and about 0.2 mm. broad, lanceolate, acute or obtuse. Lip about 0.75 mm. long and 0.75 mm. broad, ovate-quadrate to suborbicular, apiculate.

Costa Rica and Panama; possibly Honduras.

CHIRIQUI: Cerro Vaca, alt. 900–1136 m., *Pittier 5340*; "Caramillo," alt. 5000 feet, *Powell 345*.

#### 18. CRYPTOPHORANTHUS Barb. Rodr.

CRYPTOPHORANTHUS Barb. Rodr. Gen. & Sp. Orch. Nov. 2:79. 1882; Kränzl. in Fedde Rep. Sp. Nov. Beih. 34:220-232. 1925.

Small epiphytic herbs, the secondary stem terminated by a single leaf. Inflorescence short, 1-flowered or with a fascicle of flowers. Sepals connate at the base and at the apices, leaving an opening ("window") on either side between the dorsal and lateral sepals, the lateral sepals forming a mentum at the base. Petals small in comparison to the sepals. Lip free, simple, obscurely lobed or hastate, with two parallel lamellae, subequal to the petals in length. Column small, terete, erect or arcuate, produced into a short foot at the base. Anther terminal, operculate, incumbent; pollinia 2, ceraceous.





Fig. 89. *Physosiphon minutiflorus*

A small genus closely allied to *Masdevallia* and *Pleurothallis*. There are three or four species in Costa Rica and one in Panama.



1. *CRYPTOPHORANTHUS LEPIDOTUS* L. Wms. in Ann. Missouri Bot. Gard. 29:340, t. 30, figs. 4-5. 1942.

Caespitose epiphytic herbs up to about 17 cm. tall. Secondary stems 2-7 cm. long and 1-2 mm. in diameter, covered with 4-5 pergameneous, infundibuliform sheaths which soon disintegrate. Leaves oblanceolate to narrowly obovate, obtuse or acutish, coriaceous, contracted into a distinct petiole; lamina 3.5-10 cm. long; petiole 1-2 cm. long, conduplicate. Inflorescence consisting of 1-6 long-pedunculate flowers at the apex of the secondary stem; the peduncle with 1-3 short infundibuliform sheaths. Sepals joined together at the base and at the tip, leaving

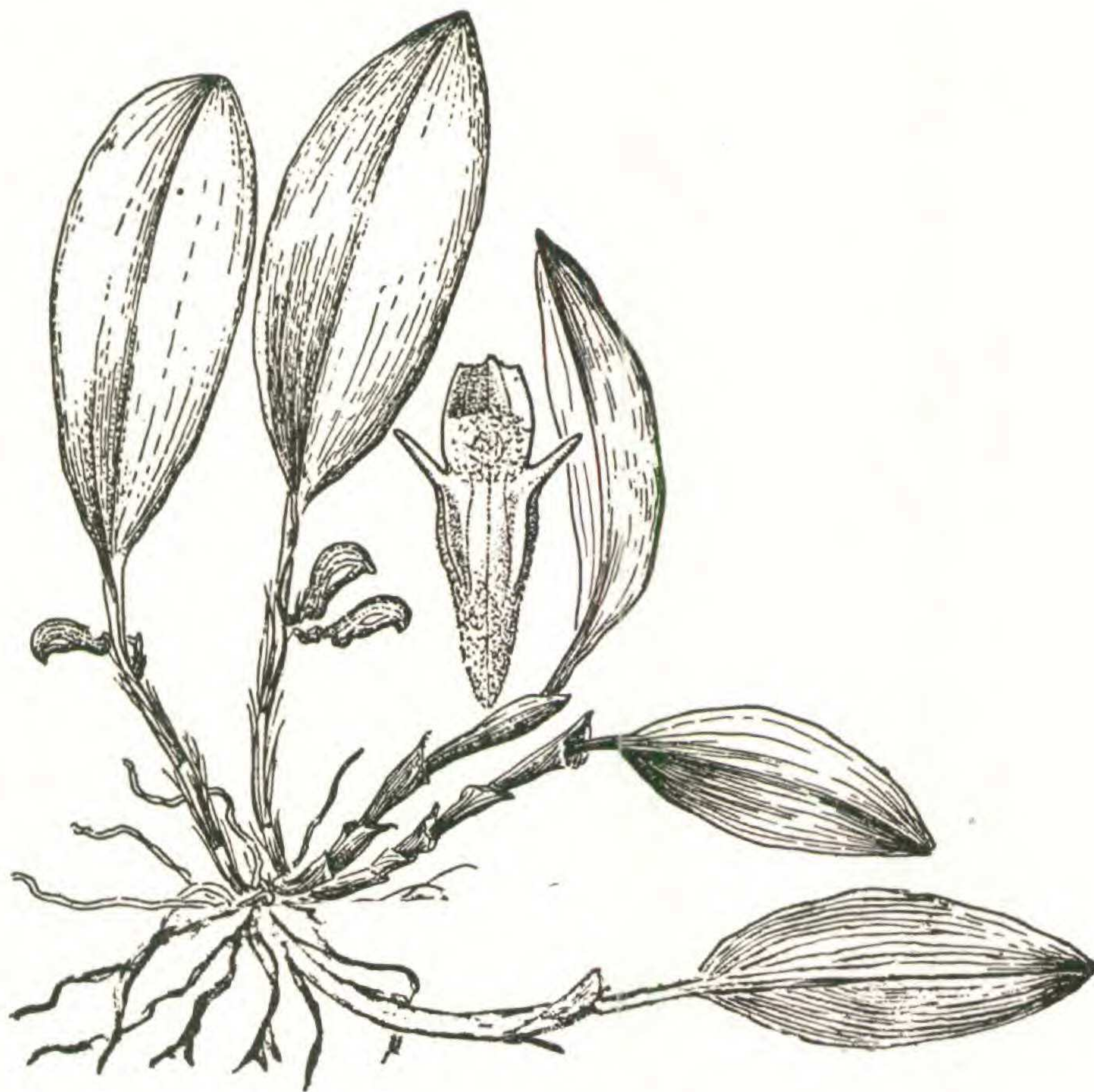


Fig. 90. *Cryptophoranthus lepidotus*

a small opening between the dorsal and lateral ones; dorsal sepal about 15-20 mm. long and 6-7 mm. broad, oblong-lanceolate, strongly cucullate, fleshy, 7-nerved, ridged dorsally and the ridges verrucose; lateral sepals connate to their apices, about 12-18 mm. long and together 6-8 mm. broad, fleshy, each about 7-nerved, with verrucose ridges dorsally. Petals 5-6 mm. long and 2.5-3.5 mm. broad, broadly ovate-lanceolate, acute or acuminate, 3-(5-)nerved. Lip 5-6 mm. long, hastate, unguiculate; lamina about 4 mm. long, 1.5-2 mm. broad, 3-nerved, verrucose or lepidote, with two longitudinal, lamellate calluses extending from the auricles to about the middle; auricles about 1 mm. long, retrorse, subulate; claw 1.5-2 mm. long and 1-1.5 mm. broad, verrucose-scurfy or lepidote toward



its apex. Column of the genus.

COCLÉ: trail to Las Minas, hills north of El Valle de Antón, alt. about 1000 m., *Allen* 2718.

#### 19. MASDEVALLIA Ruiz & Pavon

MASDEVALLIA Ruiz & Pavon, Fl. Peruv. & Chil. Prodr. ed. 1, 122. 1794; ed. 2, 110, *t.* 27. 1797; Woolward, Genus Masdevallia. 1896; Kränzl. in Fedde Rep. Sp. Nov. Beih. 34:1-202. 1925.

Caespitose or repent, epiphytic or terrestrial herbs. Secondary stems usually very short, bearing a single leaf and a peduncle or the leaves and peduncles borne on separate stems. Leaves most often broadest toward the apex and attenuated into a petiole at the base, with an abscission at the end of the secondary stem and another slightly above. Peduncles usually 1- to 2-flowered. Sepals connate into a tube at the base or to the middle or beyond, the free portions often spreading, the tips usually developed into slender tails, produced into a mentum at the base. Petals very much smaller than the sepals, usually narrow. Lip small, articulated to the column-foot, about as long as the column. Column erect, produced into a column-foot at the base; margins of the clinandrium usually membranaceous and denticulate. Anther terminal, operculate, incumbent; pollinia 2, ceraceous.

A large and complex genus of some 250 species. The species are most abundant in cool mountain regions of the tropics of the New World. The genus was once very popular with orchid fanciers, some of the rarer or more beautiful species commanding fabulous prices.

*Masdevallia* connects to the genus *Pleurothallis* at several points, notably through such species as *M. Allenii* L. Wms., which differs but slightly from the species of Schlechter's *Barbosella* (previously reduced to *Pleurothallis*). *Scaphosepalum* has several species which are "connecting links" between *Masdevallia* and *Pleurothallis*. Lindley's genus *Restrepia*, which I have reduced to *Pleurothallis*, contains some intermediate species between *Pleurothallis* and *Masdevallia*, and if *Restrepia* were to be maintained as a genus most of the species which were referred to *Barbosella* and many of the species of *Masdevallia* § *Triaristella* (*M. triaristella* Reichb. f., *M. Allenii* L. Wms., etc.) should be placed there. There is little or no technical reason why *Pleurothallis* (and *Stelis* too) should not be reduced to *Masdevallia*, but it would serve no practical purpose to do so. *Pleurothallis* and *Masdevallia* are both large and technical and most of the species can be placed in the proper genus readily.

- a. Tails of the lateral sepals originating below the apex..... 8. *M. ALLENI*
- aa. Tails of the lateral sepals, if present, terminal.
  - b. Lateral sepals with transverse calluses at the base..... 7. *M. SIMULA*
  - bb. Lateral sepals without transverse calluses at the base.
    - c. Callus at the base of the petal free and appearing to be a cauda.... 1. *M. COLLINA*
    - cc. Callus lacking at the base of the petal, or if present not free.
      - d. Lip less than 2.5 mm. long..... 6. *M. TENUISSIMA*
      - dd. Lip more than 2.5 mm. long.



- e. Dorsal sepal prolonged into a subfiliform tail.
  - f. Peduncle usually 2-flowered, about as long as the leaves or longer; lip up to 4 mm. long..... 3. *M. CHONTALENSIS*
  - ff. Peduncle 1-flowered, always shorter than the leaves; lip more than 4 mm. long..... 2. *M. ATTENUATA*
- ee. Dorsal sepal either without tails, or with tails not filiform.
  - f. Free part of the dorsal sepal lanceolate or lanceolate-ovate, erect..... 4. *M. ECAUDATA*
  - ff. Free part of the dorsal sepal ligulate or lanceolate-ligulate, recurved..... 5. *M. LIVINGSTONEANA*

1. *MASDEVALLIA COLLINA* L. Wms. in Am. Orchid Soc. Bull. 11:93, t. 3. 1942.

Small caespitose epiphytic herbs up to 15 cm. tall. Secondary stems very short, bearing a leaf and an inflorescence. Leaves 6–9 cm. long and 1.1–1.5 cm. broad, oblanceolate, obtuse, attenuated into a petiole at the base, coriaceous, 3-nerved. Inflorescence slender, (1?–)2-flowered, peduncle much exceeding the leaves. Sepals about 25 mm. long, connate into a tube for about  $\frac{1}{2}$  their length; tube 11–14 mm. long, free part of the sepals 9–14 mm. long, consisting of subfiliform caudae from a very short free lamina. Petals about 4 mm. long and 1.5 mm. broad, linear-oblong, truncate and tridentate at the apex, 1-nerved, with an elongated, sublamellate callus which extends from near the base to near the apex along the anterior margin; another callus begins near the base and extends to and off at the base forming a free, curved, cauda-like process, the free part about 1 mm. long. Lip about 6 mm. long and 2 mm. broad, linear-oblong, truncate and retuse at the base, the apex rounded, somewhat dilated and ciliate, fleshy, somewhat canaliculate, keeled on the mid-nerve below.

Panama.

COCLÉ: hills north of El Valle de Antón, alt. about 1000 m., *Allen 2158*.

2. *MASDEVALLIA ATTENUATA* Reichb. f. in Gard. Chron. 834. 1871; Woolw. Genus *Masdevallia* t. [35]. 1896; Hook. f. in Bot. Mag. 33: t. 6273. 1877.

*Masdevallia Laucheana* Kränzl. ms. ex Woolw. loc. cit. t. [19]; Kränzl. in Fedde Rep. Sp. Nov. Beih. 34:166. 1925.

Small, caespitose, epiphytic herbs up to about 15 cm. tall. Secondary stems very short. Leaves 5–13 cm. long and 0.5–1.8 cm. broad, linear-oblanceolate to oblanceolate, acute or obtuse, attenuated into a petiole at the base. Inflorescence 1-flowered; peduncles slender, shorter than the leaves. Sepals 18–22 mm. long, connate into a tube for about  $\frac{1}{3}$  their length, the caudate apices about as long as the broad part of the sepals, puberulent within, the broad, free part of the sepals oblong-ovate to triangular-ovate. Petals 3.5–5 mm. long and 1.2 mm. broad, subrhombic to oblong-lanceolate, acute, somewhat oblique, with a longitudinal callus along one margin. Lip 4.2–5 mm. long and 1.5–2 mm. broad, oblong-lanceolate to oblong-pandurate, obtuse or acute, apical portion denticulate, with two longitudinal keels which converge toward the apex.

Costa Rica and Panama.

CHIRIQUÍ: Boquete, alt. about 1360 m., *Davidson 1271*; "Chiriquí," *Pfau*; "Cerro Horconcito," alt. about 1360 m., *Powell 268*.



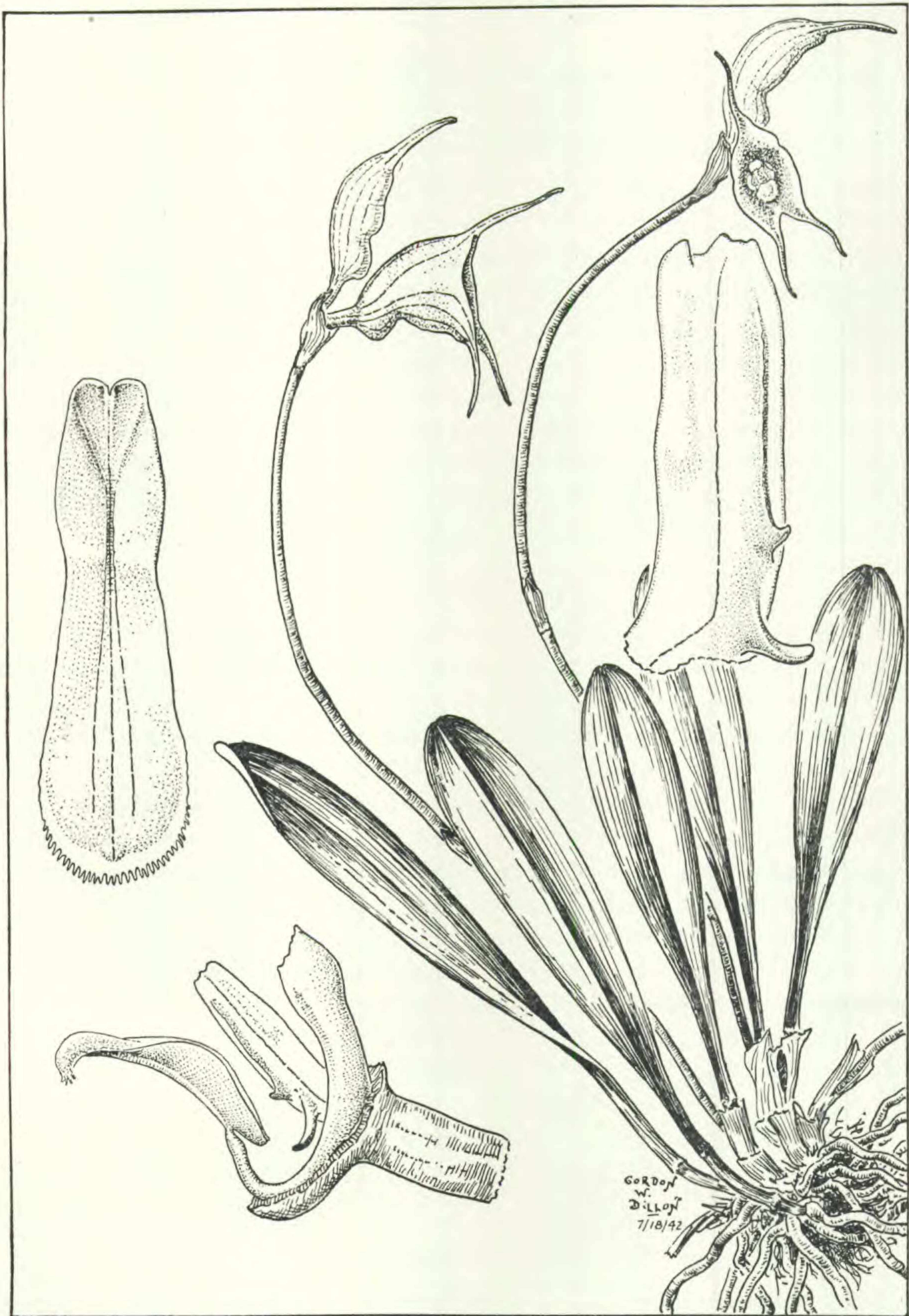


Fig. 91. *Masdevallia collina*



Possibly the original collection of this species was from Chiriquí (*Pfan*), Powell's collection differs slightly from the others. The species is rare and more specimens are desired for study.

3. MASDEVALLIA CHONTALENSIS Reichb. f. in *Otia Bot. Hamb.* 1:274. 1878; L. Wms. in *Ann. Missouri Bot. Gard.* 27:274. 1940.

*Masdevallia diantha* Schltr. in *Beih. Bot. Centralbl.* 36, Abt. 2:384. 1918.

Small, caespitose, epiphytic herbs up to about 11 cm. tall. Secondary stems up to about 2 mm. long. Leaves 2–9 cm. long and 0.2–0.8 cm. broad, oblanceolate to linear-oblanceolate, acute or obtuse, attenuated into a petiole at the base. Inflorescence 1- or usually 2-flowered; peduncles from almost as long as the leaves to twice as long. Sepals 9–18 mm. long, connate into a tube for about  $\frac{1}{2}$  or  $\frac{3}{5}$  their length, the free part ovate to ovate-lanceolate and caudate. Petals 2.5–3.5 mm. long and 0.7–1.2 mm. broad, linear-oblong to oblong-lanceolate, apex tridentate, truncate or obtuse, with a small lateral callus extending from about the middle toward the apex. Lip 2.8–4 mm. long and 0.9–1.7 mm. broad, oblong-oblanceolate to oblong-obovate, biauriculate at the base, with two longitudinal callus-ridges extending from the base nearly to the apex where they converge, dilated apical part denticulate.

Nicaragua, Costa Rica and Panama.

COCLÉ: vicinity of El Valle, alt. 600–1000 m., *Allen 1231*; vicinity of El Valle, north rim, alt. 800–1000 m., *Allen 1826*; trail to Las Minas, El Valle de Antón, alt. 1000 m., *Allen 2876*.

4. MASDEVALLIA ECAUDATA Schltr. in *Beih. Bot. Centralbl.* 36, Abt. 2:384. 1918; L. Wms. in *Ann. Missouri Bot. Gard.* 27:274. 1940.

Small, caespitose, epiphytic herbs up to about 12 cm. tall. Secondary stem short, 2–10 mm. long. Leaves 3–9 cm. long and 0.6–1.1 cm. broad, oblanceolate, obtuse, coriaceous, attenuated into a petiole at the base. Inflorescence about as long as or exceeding the leaves, 1-flowered, the peduncle slender. Sepals puberulent within, about 15–22 mm. long, connate into a tube about  $\frac{2}{3}$  of their length, the free parts lanceolate to ovate-lanceolate, acute or acuminate, usually ecaudate but sometimes caudate, the apices thickened. Petals 5–8 mm. long and 1.5–3.5 mm. broad, oblong-ovate, short-unguiculate, usually angled on one side. Lip 6.5–9 mm. long and 2–3.5 mm. broad, oblong-lanceolate, auriculate at the base, disc with a pair of longitudinal fleshy calli.

Costa Rica and Panama.

CHIRIQUÍ: valley of the upper Río Chiriquí Viejo, *White & White 81*.

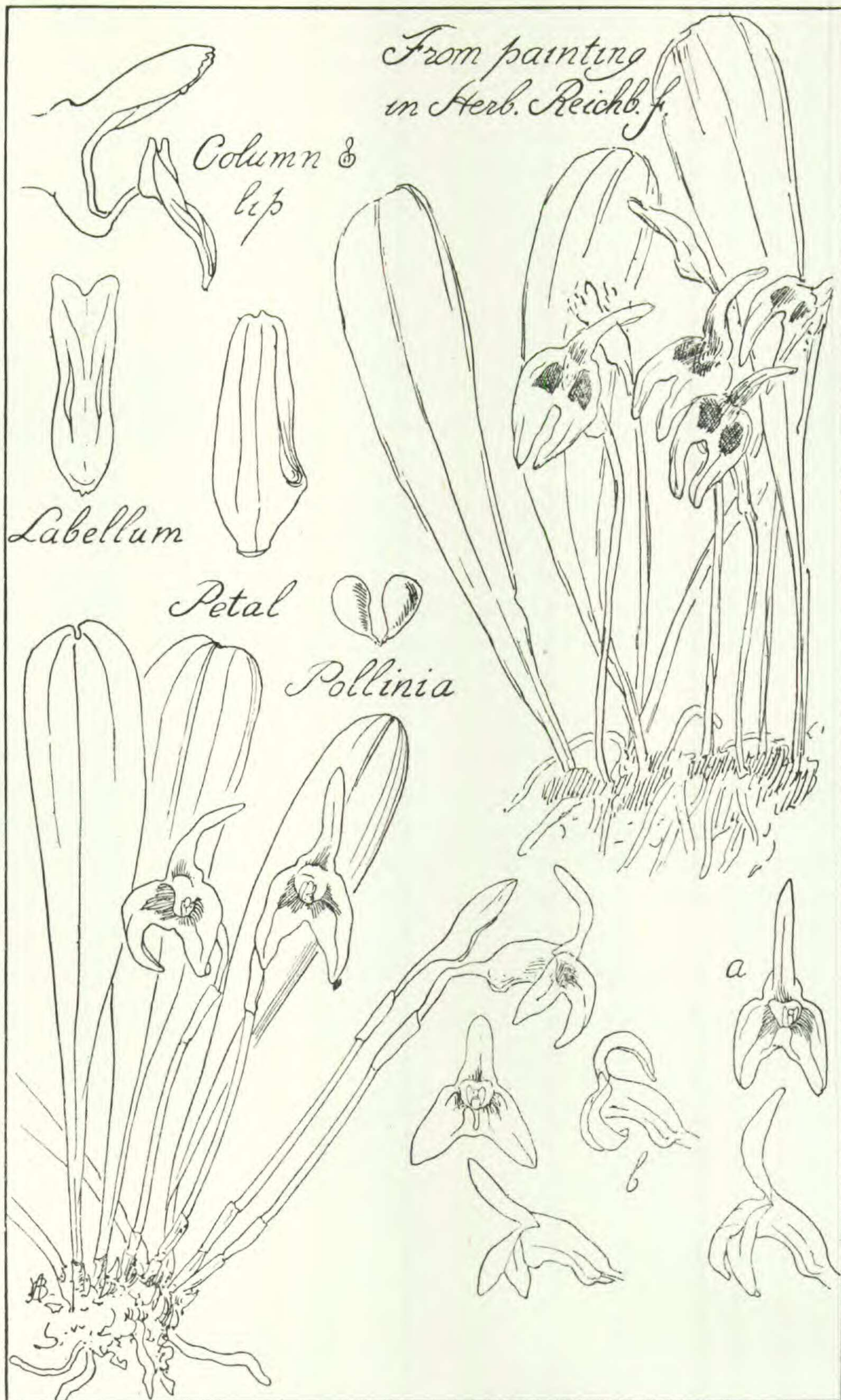
Very closely allied to *M. Livingstoneana*, from which it differs mainly in having slightly different sepals and petals and a larger lip.

5. MASDEVALLIA LIVINGSTONEANA Reichb. f. in *Gard. Chron.* II, 2:322. 1874; Ames, *Sched. Orch.* 5:9, *fig. 2*. 1923.

*Scaphosepalum panamense* Schltr. in *Fedde Rep. Sp. Nov.* 12:205. 1913.

*Masdevallia panamensis* Ames, *Sched. Orch.* 4:9. 1923.



Fig. 92. *Masdevallia Livingstoneana*

Small, caespitose, epiphytic herbs up to 13 cm. tall. Secondary stems short. Inflorescence 1-flowered, peduncle shorter than the leaves. Sepals 15–20 mm. long, connate into a tube for about  $\frac{1}{2}$  their length; free portion of dorsal sepal up to 12 mm. long and 3 mm. broad at the base, ligulate or lanceolate-ligulate,



somewhat thickened and fleshy toward the apex; free part of the lateral sepals up to 12 mm. long and 5 mm. broad, lanceolate-triangular, arcuate, acute or obtuse. Petals 4.5–5 mm. long and 1.5–2 mm. broad, oblong, obtuse, with a single longitudinal sublamellate callus extending from below the middle to the apex. Lip 4–6 mm. long and 1–1.2 mm. broad, oblong to oblong-lanceolate, acute or obtuse, sometimes more or less pandurate, the disc thickened and with two raised, longitudinal calli.

Costa Rica (?) and Panama.

CANAL ZONE: forest along Río Indio de Gatún, alt. near sea-level, *Pittier 2803*; west of canal near village of Arraján, alt. near sea-level, *Powell 223*. PANAMÁ: foothills east of Panama City and San Juan, alt. near sea-level, *Powell 273, 411, 3282, 3287*.

6. *MASDEVALLIA TENUISSIMA* C. Schweinf. in Bot. Mus. Leafl. Harv. Univ. 4:111. 1937.

Small, caespitose, epiphytic herbs up to about 3 cm. tall. Secondary stems very short, up to about 1 mm. long. Leaves 1–2.2 cm. long and 1–2.5 mm. broad, linear-oblongate, obtuse or acute, attenuated into a narrow petiole at the base. Inflorescence up to 3 cm. long, exceeding the leaves; scape filiform. Sepals connate into a tube at the base; dorsal sepal about 6 mm. long and 2.5 mm. broad, caudate, the lamina about 2.5 mm. long and as broad, suborbicular. Lateral sepals about 7.5 mm. long and each about 1 mm. broad, caudate, free part of lamina lanceolate. Petals about 2 mm. long and about 0.75 mm. broad, oblong-lanceolate, subtruncate, triapiculate. Lip about 2 mm. long and 0.7 mm. broad, oblong-lanceolate, obtuse, with 2 inconspicuous, submarginal, lamellate calli extending from the base to the middle, shortly bicaudate at the base, the caudae about 0.2 mm. long. Ovary inconspicuously muricate on the angles.

Panama.

COCLÉ: mountains beyond La Pintada, alt. 400–600 m., *Hunter & Allen 587*.

*Masdevallia pygmaea* Kränzl. will possibly include this species when the type can be studied.

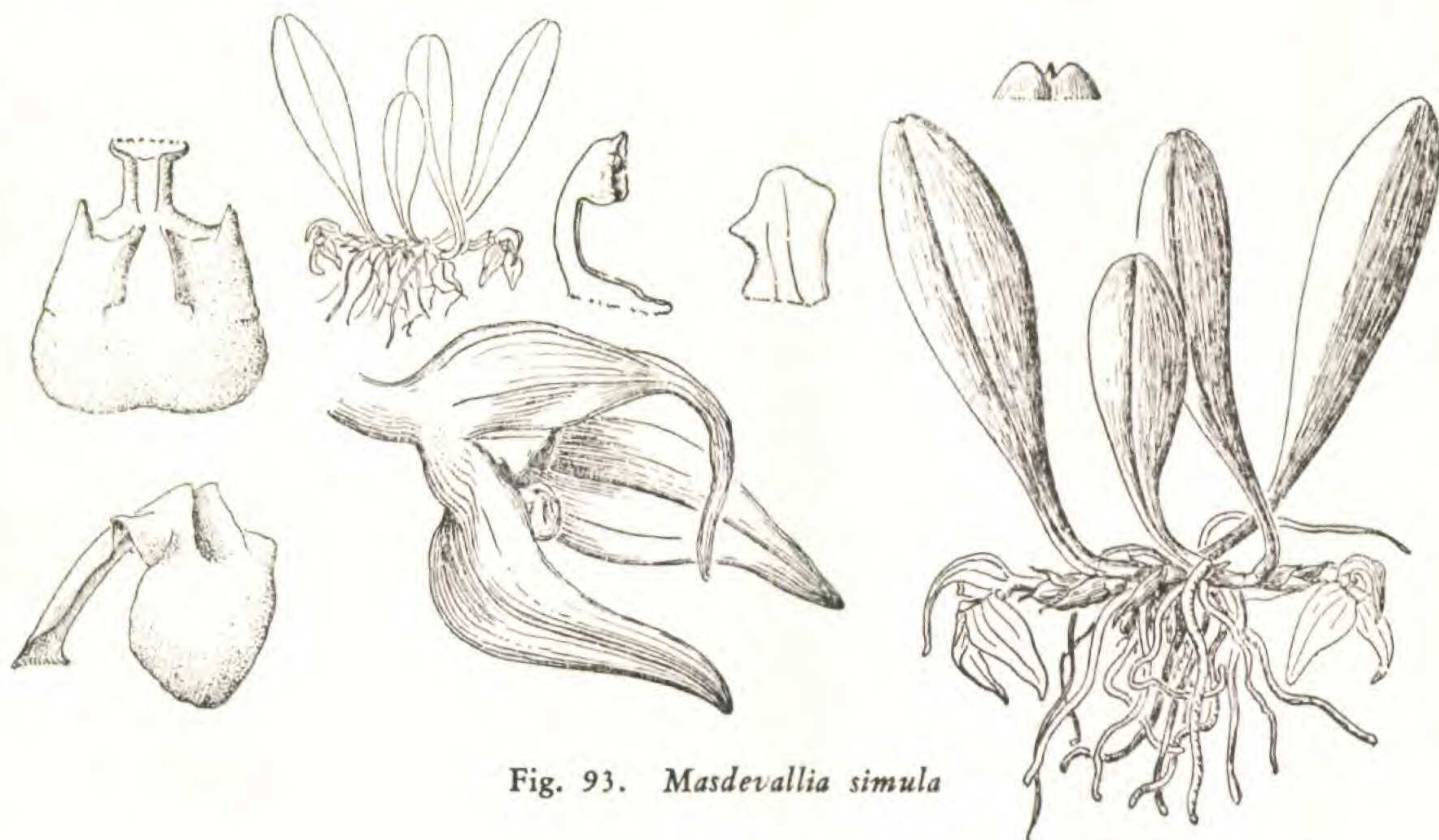


Fig. 93. *Masdevallia simula*



7. *MASDEVALLIA SIMULA* Reichb. f. in Gard. Chron. n. s. 3:8. 1875; Woolw. Genus *Masdevallia*, t. [71]. 1890; L. Wms. in Ann. Missouri Bot. Gard. 27:274, pl. 31, figs. 1-8. 1940.

Small caespitose or repent epiphytic herbs up to about 9 cm. tall. Secondary stems up to about 1 mm. long. Leaves 1-10 cm. long and 0.2-0.5 cm. broad, linear to oblanceolate, attenuated into a petiole at the base. Inflorescences 1-3-flowered, much shorter than the leaves. Sepals connate for only a short distance at the base; dorsal sepal 3.5-9 mm. long and 2-4 mm. broad, lanceolate to ovate-lanceolate or triangular-lanceolate, acute, acuminate or caudate; lateral sepals similar to the dorsal except usually somewhat falcate and each provided with a transverse, semi-lunate callus at the base. Petals 1.5-3 mm. long and 1.5-3 mm. broad, subquadrate or subrhombic, angulate. Lip 2-3.5 mm. long and 1.2-3 mm. broad, unguiculate; lamina subquadrate to subquadrate-obovate, biauriculate at the base, with two lamellate calli near the junction with the claw.

Guatemala, Honduras, Costa Rica, Panama, Colombia, and Ecuador.

CANAL ZONE: in tops of high trees, Quebrada Lopez, alt. about 30 m., Allen 2115.



Fig. 94. *Masdevallia Allenii*

*Masdevallia simula* is quite a diverse species in Central America and may prove to be either an aggregate or a polymorphic. It is not a typical *Masdevallia* and might almost as well be placed in *Pleurothallis*. The forms *M. guatemalensis* Schltr. and *M. linearifolia* Ames are included in the description.

8. *MASDEVALLIA ALLENII* L. Wms. in Ann. Missouri Bot. Gard. 27:273, pl. 31, figs. 12-16. 1940.

Small caespitose epiphytic herbs up to about 5 cm. tall. Secondary stems about 3 mm. long, covered with white chartaceous sheaths. Leaves 10-20 mm. long and up to 2 mm. broad, linear, acute, coriaceous, subterete and canaliculate. Inflorescence 1-flowered, longer than the leaves; peduncle about 3-4 cm. long. Sepals forming a short tube at the base; lamina of the dorsal sepal 2.5-3 mm. long and 3-3.5 mm. broad, free portion of the lamina triangular, long-caudate, the cauda filiform and about 10 mm. long; lateral sepals 12-15 mm. long, connate to their apices or nearly so, the lamina lanceolate, with a lateral, filiform appendage about 5-6 mm. long near the apex on either



side. Petals 1.5–2 mm. long and about 0.75 mm. broad, oblong, obtuse. Lip about 3 mm. long and 1 mm. broad, lanceolate or lanceolate-oblong, obtuse, bicaudate at the base; the lamina with two longitudinal calli.

Panama.

COCLÉ: vicinity of El Valle, alt. 600–1000 m., *Allen 1230*.

## 20. SCAPHOSEPALUM Pfitzer

SCAPHOSEPALUM Pfitz. in Engler & Prantl, Nat. Pflanzenfam. 2<sup>6</sup>:139. 1888; Kränzl. in Fedde Rep. Sp. Nov. Beih. 34:204–219. 1925.

Caespitose or repent epiphytic or terrestrial herbs. Secondary stems very short, unifoliate. Leaves mostly broadest near the apex and attenuated into a petiole at the base. Inflorescence a distichous raceme. Sepals connate at the bases; the dorsal sepal free or nearly so, sometimes caudate; lateral sepals more or less united, usually forming a cymbiform synsepal, often callus-thickened near the apices, the apices often attenuated into tails. Petals much shorter than the sepals. Lip small, articulated to the column-foot. Column erect, produced into a foot at the base; margins of the clinandrium membranaceous and denticulate. Anther terminal, operculate, incumbent; pollinia 2, ceraceous.

*Scaphosepalum* is hardly distinct from *Masdevallia*. The one Panamanian species might well be placed in *Pleurothallis*.

1. SCAPHOSEPALUM ELASMOTOPUS Schltr. in Fedde Rep. Sp. Nov. 12:204. 1913. *Scaphosepalum longirepens* Ames in Proc. Biol. Soc. Wash. 34:153. 1921.

Small, repent, epiphytic herbs. Rhizome elongated. Secondary stems short, up to about 5 mm. long, bearing a leaf or a leaf and a peduncle, with an additional abscission layer in the petiole above the apex of the secondary stem. Leaves 7.5–15 cm. long and 0.7–1.4 cm. broad, oblanceolate, acute, coriaceous, attenuated into a slender petiole at the base. Inflorescence about as long as or shorter than the leaves; raceme distichous, several-flowered, up to about 6 cm. long. Dorsal sepal free nearly to the base, about 5–8 mm. long, obtuse, oblong-ligulate, the apex thickened. Lateral sepals joined nearly to their apices, 6–10 mm. long, the lamina oblong, short-caudate at the apex. Petals 3–3.5 mm. long, elliptic-oblong to elliptic-ovate, oblique, acute. Lip about 3 mm. long, short-unguiculate; lamina oblong-pandurate or ovate-oblong and constricted toward the middle, the terminal lobe rounded, ciliate.

Panama.

CHIRIQUÍ: east of Río Caldera, alt. 2000 m., *Killip 3567*; between Alto de las Palmas and top of Cerro de la Horqueta, alt. 2100–2268 m., *Pittier 3229, 5730*. CANAL ZONE: Quebrada Lopez, alt. 30 m., *Allen 2130*.

This species has been reduced to *Scaphosepalum macrodactylon* Rolfe by Kränzlin. Kränzlin probably did not see material from Panama.



## 21. LEPANTHES Sw.

LEPANTHES Sw. in Nova Acta Soc. Sci. Upsal. 6:85. 1799; in Svensk. Vet-Akad. Handl. 21:249. 1800.

Small repent or caespitose epiphytic herbs. Stems (secondary stems) generally unifoliate, with several loose, often ciliate and pubescent, sheaths below. Leaves coriaceous. Inflorescence terminal, 1 or few from the base of the leaves, the flowers small, often distichous. Sepals subequal, often more or less connate at the bases or the laterals connate nearly to their apices. Petals shorter than the sepals, bipartite or transversely bilobed, usually short-unguiculate and adnate to the column, except *L. eximia*. Lip bilobed or sometimes trilobed, with the mid-lobe small and inconspicuous, adnate to the column, the lobes usually appearing as wings. Column short, footless, wingless, dilated at the apex; anther terminal, operculate, incumbent; pollinia 2, waxy.

An easily distinguished genus with many closely allied and poorly defined species.

- a. Petals simple, not bilobed and transverse..... 8. *L. EXIMIA*
- aa. Petals not simple, bilobed and transverse.
  - b. Sepals linear-lanceolate, at least 5 times longer than broad..... 7. *L. INSECTIFLORA*
  - bb. Sepals broader than linear-lanceolate, less than 5 times longer than broad.
    - c. Anterior lobe of the petal as long as the dorsal sepal..... 5. *L. ROTUNDIFOLIA*
    - cc. Anterior lobe of the petal shorter than the dorsal sepal.
      - d. Dorsal sepal less than 4 mm. long.
        - e. Petals 3-nerved..... 6. *L. TURALVAE*
        - ee. Petals 1-nerved..... 1. *L. CHIRIQUENSIS*
      - dd. Dorsal sepal 4 mm. long or longer.
        - f. Petal 1-nerved; dorsal sepal 14-17 mm. long..... 4. *L. MAXONII*
        - ff. Petals 3-(5-)nerved; dorsal sepal 4-8 mm. long.
          - g. Dorsal sepal about 4-6 mm. long, ovate..... 3. *L. ECILIATA*
          - gg. Dorsal sepal about 8 mm. long, lanceolate..... 2. *L. ELATA*

1. *LEPANTHES CHIRIQUENSIS* Schltr. in Fedde Rep. Sp. Nov. Beih. 17:17. 1922.  
*Lepanthes micrantha* Ames, Sched. Orch. 4:31. 1923.

Small, caespitose, epiphytic herbs up to 10 cm. tall. Secondary stems slender, up to about 8 mm. long. Leaves 1-4 cm. long and 0.3-1.1 cm. broad, variable, linear-lanceolate to ovate. Inflorescence few-flowered, shorter than the leaves. Dorsal sepal 2-2.5 mm. long and 1.2-1.5 mm. broad, oblong-ovate to lanceolate-ovate, acute. Lateral sepals 1.5-2 mm. long and 0.75-1.2 mm. broad, ovate-lanceolate, acute, arcuate, sometimes denticulate toward the apex. Petals 0.5-0.7 mm. long and 2-2.5 mm. broad, transverse, ciliate, the lobes lanceolate to ovate-lanceolate. Lip 0.75-1.2 mm. long and 0.75-1 mm. broad, 3-lobed; the lateral lobes malleoliform, about 0.75-1.2 mm. long; mid-lobe small, apiculiform, about 0.2 mm. long.

Costa Rica and Panama.

CHIRIQUÍ: vicinity of Monte Lirio, valley of upper Río Chiriquí Viejo, alt. 1300-1900 m., Seibert 174, 194, 198; "Province of Chiriquí," alt. 4500 ft., Powell 254.



*Lepanthes chiriquensis* has been referred to *L. Lindleyana* Oerst. & Reichb. f. as a synonym, which it may be, but the original description and figures of *L. Lindleyana* are either very inaccurate or the species is quite different.

2. LEPANTHES ELATA Reichb. f. Beitr. Orch. Centr.-Am. 90. 1866.

Rather large, caespitose, epiphytic herbs up to 6 dm. tall. Secondary stems up to 5 dm. long, covered with scarious sheaths which are glabrous or at most ciliate. Leaves 3.5–12 cm. long and 1.8–7 cm. broad, lanceolate-ovate to oval, acuminate. Inflorescences 1 or more from the axils of each leaf, densely flowered; bracts very crowded, ovate-acuminate, infundibuliform. Dorsal sepal about 8 mm. long and 3 mm. broad, lanceolate, acuminate. Lateral sepals about 8 mm. long and 3 mm. broad, lanceolate, acuminate, somewhat oblique, connate nearly to the middle. Petals transverse, about 5 mm. broad; the posterior lobe about 2.5 mm. long, oblong-obovate; the anterior lobe about 2.5 mm. long and about 2 mm. broad, the lateral lobes malleoliform, the mid-lobe small, apiculiform.

Costa Rica and Panama.

CHIRIQUÍ: Bajo Chorro, alt. 6000 ft., *Davidson 237*.

3. LEPANTHES ECILIATA Schltr. in Fedde Rep. Sp. Nov. 12:203. 1913.

Erect, caespitose, epiphytic herbs up to about 18 cm. tall. Secondary stems slender, covered with several sheaths, the mouths of which are eciliate but puberulous. Leaves 3.5–7.5 cm. long and 0.8–1.8 cm. broad, elliptic or lanceolate, erect, attenuated to the base. Inflorescences several, about half as long as the leaves. Sepals ovate, ciliate; dorsal sepals about 4–6 mm. long and about 3.5 mm. broad, short-acuminate; lateral sepals about 4–5 mm. long and together about 3.5 mm. broad, acuminate, oblique, connate to about the middle. Petals about 4 mm. broad, transverse, glabrous; anterior lobe oblong, oblique, obtuse; posterior lobe narrowly oblong, obtuse, oblique. Lip about 1–1.5 mm. long, bipartite and with an apicule in the sinus, lobes semirhombic, obtuse, glabrous.

Panama.

CHIRIQUÍ: Bajo Chorro, alt. about 1800 m., *Davidson 128 in part*; Cerro de la Horqueta, alt. 1700 m., *Pittier 3173*.

4. LEPANTHES MAXONII Schltr. in Fedde Rep. Sp. Nov. 12:204. 1913.

Small, caespitose, epiphytic herbs up to about 15 cm. tall. Secondary stems up to about 9 cm. long, covered with several pubescent or scabrous infundibuliform bracts. Leaves 3.5–5.5 cm. long and 1.5–2.5 cm. broad, ovate, acuminate, apex tridenticulate. Inflorescence distichous, fractiflex, exceeding the leaves; flowers large for the genus. Sepals connate at the base; dorsal sepal 14–17 mm. long and about 4–5 mm. broad, triangular-lanceolate or lanceolate, long-acuminate; lateral sepals connate to the middle or beyond, 12–17 mm. long and together 5–6 mm. broad, broadly lanceolate, acute or acuminate. Petals transverse, about 3–4 mm. broad; anterior lobe narrowly oblong to lanceolate, arcuate, acute or obtuse, about equal to the posterior lobe in length; posterior lobe narrowly lanceolate,



arcuate, acute. Lip about 1 mm. long and 1 mm. broad, bipartite, the lobes sub-rhombic.

Panama.

CHIRIQUÍ: between Alto de las Palmas and Cerro do la Horqueta, alt. 2100–2268 m., *Maxon 3256*; same locality, *Pittier 5494*.

5. *LEPANTHES ROTUNDIFOLIA* L. Wms. in *Ann. Missouri Bot. Gard.* 27: 275, *pl. 31, figs. 9-11*. 1940.

Small, caespitose, epiphytic herbs up to about 8 cm. tall. Secondary stems slender, covered with sheaths which are glabrous except at their margins. Leaves about 25 mm. long and 19–28 mm. broad, orbicular or orbicular-ovate, or even broader than long, coriaceous. Inflorescence distichous, shorter than the leaves. Dorsal sepal about 3 mm. long and 2 mm. broad, suborbicular, abruptly acuminate. Lateral sepals about 2.5 mm. long and 2 mm. broad, suborbicular, obtuse or acutish, connate at their bases. Petals bipartite; lobes near the dorsal sepal longest, about 3.5 mm. long and 1 mm. broad, lanceolate, acute, oblique; lobes near the lateral sepals about 2 mm. long and 0.8 mm. broad, lanceolate, acute, oblique. Lip bipartite, about 1.5 mm. long and 2 mm. broad, the lobes malleoliform.

Panama.

COCLÉ: north rim, vicinity of El Valle, alt. 800–1000 m., *Allen 1835*.

6. *LEPANTHES TURIALVAE* Reichb. f. in *Bonplandia* 3:225. 1855; *Xenia Orch.* 1:151, *t. 50, figs. V, 15-16*. 1855.

Small epiphytic herbs up to 15 cm. tall. Secondary stems slender, covered with sheaths which are usually dark-colored. Leaves 1.5–4.5 cm. long and 0.9–2 cm. broad, elliptic-oblong to suborbicular, attenuated into a short petiole at the base. Sepals lanceolate to ovate-lanceolate, acute; dorsal sepal about 2.5–3.5 mm. long and 1.5–2.2 mm. broad; lateral sepals about 2.2–3 mm. long and 1–1.5 mm. broad, connate to the middle or beyond. Petals about 0.5–1.5 mm. long and 3–4 mm. broad, transverse, posterior lobe the larger. Lip about 1–1.5 mm. long and 1.5–2 mm. broad, trilobate; the lateral lobes large and peltate or flattened; mid-lobe apiculiform.



Fig. 95. *Lepanthes rotundifolia*



Mexico to Panama.

CHIRIQUÍ: vicinity of Casita Alta, alt. 1500–2000 m., *Woodson, Allen & Seibert 954*.  
COCLÉ: vicinity of El Valle, alt. 600–1000 m., *Allen 1241*; north of El Valle de Antón,  
alt. 800–1000 m., *Allen 2265*.

The description is based on Panamanian material only. *Lepanthes turialvae*, as now delimited, is possibly an aggregate of several species.

7. LEPANTHES INSECTIFLORA C. Schweinf. in Bot. Mus. Leaflet Harv. Univ. 7:152. 1939.

Small, caespitose, epiphytic herbs up to about 9 cm. tall. Secondary stems slender, 2.5–7.5 cm. long. Leaves up to 2.5 cm. long and 0.9 mm. broad, elliptic-oval to subrhombic, apex tridenticulate. Inflorescence several-flowered, shorter than the leaves. Sepals about 5 mm. long and 0.5–1 mm. broad, linear-lanceolate, acuminate. Petals transversely bipartite; posterior lobe about 3 mm. long, sub-filiform; anterior lobe about 0.7 mm. long, subovate. Lip about 1 mm. long and as broad, suborbicular, deeply emarginate and bilobed, with a minute apicula in the sinus.

Panama.

CHIRIQUÍ: Bajo Chorro, alt. about 1800 m., *Davidson 185*.

Differs from *L. tipulifera* Reichb. f. only in having the anterior lobe of the petal shorter. Material seen inadequate.

8. LEPANTHES EXIMIA Ames, Sched. Orch. 5:21. 1923.

*Lepanthes abnormis* Schltr. in Fedde Rep. Sp. Nov. Beih. 19:21. 1923.

Small, caespitose, epiphytic herbs up to 6 cm. tall. Secondary stems very slender, up to 4 cm. long, covered with infundibuliform sheaths. Leaves 0.6–2 cm. long, 0.4–0.7 cm. broad, elliptic to oval, acute or obtuse, attenuated to the base. Sepals 2–3 mm. long and 1–1.5 mm. broad, ovate-lanceolate, acute or acuminate, denticulate. Petals 1–1.5 mm. long and 0.2–0.4 mm. broad, linear, auriculate on the anterior margin at the base, not transverse. Lip 1–1.4 mm. long and 0.6–0.8 mm. broad, oblong to subquadrate, short-unguiculate, retuse or emarginate, ecallose.

Costa Rica and Panama.

CHIRIQUÍ: Bajo Chorro, alt. about 1800 m., *Davidson 186*.

Unusual in having petals which are not transverse.

## 22. ACOSTAEA Schltr.

ACOSTAEA Schltr. in Fedde Rep. Sp. Nov. Beih. 19:283. 1923.

Small, caespitose, epiphytic herbs. Secondary stems very short, unifoliate, covered with a loose sheath. Leaves subcoriaceous, attenuated into a petiole at the base and with an abscission layer above the one at the apex of the secondary stem. Inflorescence terminal, usually one from each stem, few-flowered; flowers small. Dorsal sepal broad, cucullate, enclosing the column. Lateral sepals connate into an oblong, bidentate lamina, longer than the dorsal sepal. Petals small,



linear, inserted on the apex of the column-foot, retuse at the apex and with a large, auriculate, hood-shaped callus or ligule toward the base. Column arcuate, with a broad, membranaceous wing on each side; column-foot elongated, subequal to the column; pollinia 2, ceraceous.

A small genus of only two species, one Panamanian. Perhaps the most distinctive of the *Pleurothalloid* genera in Central America.

1. *ACOSTAEA COSTARICENSIS* Schltr. in Fedde Rep. Sp. Nov. Beih. 19:284. 1923.

Very small, caespitose, epiphytic herbs up to about 3 cm. tall. Secondary stems up to about 1 mm. long. Leaves 9–15 mm. long and 2.5–6 mm. broad, obovate-spatulate, obtuse, attenuated into a petiole at the base. Inflorescence up to about 3 cm. long, few-flowered; peduncle slender, exceeding the leaves; flowers small. Dorsal sepal 2.5–3 mm. long and 3–4 mm. broad, suborbicular, transverse, strongly cucullate, obtuse. Lateral sepals 4–5.5 mm. long and together 2–2.5 mm. broad, elliptic to elliptic-oblong, connate nearly to their apices and with the free parts acute. Petals 1.5–2 mm. long and 0.3–0.5 mm. broad, ligulate, obtuse or acute, falcate. Lip 2–2.5 mm. long and 0.5–1 mm. broad, with a large, thin, hood-shaped callus near the base, apex emarginate and the lobules divergent. Column arcuate, broadly winged, the wings membranaceous and subquadrate.

Costa Rica and Panama.

COCLÉ: hills north of El Valle de Antón, alt. about 1000 m., *Allen 2352*; trail to Las Minas, El Valle de Antón, alt. 1000 m., *Allen 2892*; mountains beyond La Pintada, alt. 400–600 m., *Hunter & Allen 593*.

23. *PLEUROTHALLIS* R. Br.

*PLEUROTHALLIS* R. Br. in Aiton, Hort. Kew. ed. 2, 5:211. 1813; Lindl. Folia Orch. Pleuroth. 1859.

*Restrepia* HBK. Nov. Gen. & Sp. Pl. 1:366, t. 94. 1816.

*Kraenzlinella* O. Ktze. in Post & Kuntze, Gen. Phan. 310. 1904.

*Platystele* Schltr. in Fedde Rep. Sp. Nov. 8:565. 1910.

Small to medium-sized epiphytic herbs with caespitose or repent primary stems. Inflorescence terminal or rarely pseudo-radical. Sepals subequal, erect or spreading; dorsal sepal free or connate with the lateral sepals for a short distance, apex sometimes clavellate; lateral sepals from nearly free to connate to their tips, often gibbous at the base. Petals usually shorter and narrower than the sepals, apices plain or clavellate. Lip simple or three-lobed, shorter or about as long as, or sometimes longer than, the petals, often unguiculate. Column about as long or shorter than the lip, winged or wingless, produced into a foot, or sometimes footless at the base; column-foot, when present, from short to as long as the column. Anther terminal, operculate; pollinia 2 or 4, ceraceous.

*Pleurothallis* is one of the largest of the New World genera of orchids with many diverse forms. The division of the genus most often used is that which was proposed by Pfitzer (in Engl. & Prantl, Nat. Pflanzenfam., Nachträge zu Teil II-IV:105. 1897), but that is wholly artificial and quite impossible to use. The



separations used here are quite as artificial as those of Pfitzer and have nothing to recommend them except, as far as the Panamanian species are concerned, they are convenient even though they are not absolute. Further, it may cause allied species to be widely separated.

- a. Apices of the dorsal sepals or of the petals not clavellate.
- b. Sheaths not appressed to the stems, ciliate at their mouths....Series I. LEPANTHIFORMES (p. 86)
- bb. Sheaths usually appressed to the stems, their mouths always glabrous.
- c. Inflorescence exceeded by the subtending leaf, 1-flowered, fascicled or racemose .....Series II. BRACHYSTACHEAE (p. 86)
- cc. Inflorescence subequal to or exceeding the subtending leaf, 1-flowered, a fascicle on a long peduncle, or racemose.....Series III. ELONGATAE (p. 87)
- aa. Apices of the dorsal sepals and of the petals clavellate.....Series IV. RESTREPIAE (p. 88)

Series I. LEPANTHIFORMES.—A small, rather natural group of species which are easily distinguished by the loose ciliate sheaths; inflorescence either longer or shorter than the subtending leaf.

- a. Petals not ciliate nor ciliate-lacerate toward the apex; stems with 1-3 leaves..... 1. *P. BROADWAYI*
- aa. Petals ciliate or ciliate-lacerate toward the apex.
- b. Sepals glandular-pubescent dorsally..... 2. *P. GNOMONIFERA*
- bb. Sepals glabrous and smooth dorsally.
- c. Leaves narrowly elliptic to oval, margins not recurved..... 3. *P. BLAISDELLII*
- cc. Leaves broadly oval to suborbicular-ovate, sphacelate margins prominently recurved..... 4. *P. ROTUNDATA*

Series II. BRACHYSTACHEAE.—An artificial group which probably has no phylogenetic value but is of value in separating and keying species of this difficult genus. Plants in which the inflorescence is exceeded by the subtending leaf. Inflorescence a single flower, a fascicle of flowers, a raceme or fascicle of racemes.

- a. Inflorescence a fascicle of one to many flowers at the apex of the secondary stem.
- b. Leaves distinctly cordate at the base, mostly broad.
- c. Lip about 6 mm. long; petals 2- to 3-nerved; flowers relatively large..... 5. *P. CARDIOCHILA*
- cc. Lip 4 mm. or less long; petals 1-nerved; flowers relatively small.
- d. Petals ciliate or denticulate.
- e. Base of the lamina of the lip with a transverse E-shaped callus..... 6. *P. RHODOGLOSSA*
- ee. Base of the lamina of the lip without an E-shaped callus.
- f. Lip triangular or triangular-subquadrate; disc smooth..... 7. *P. TRIANGULABIA*
- ff. Lip cordate to oblong-cordate; disc verrucose..... 8. *P. ANTONENSIS*
- dd. Petals neither ciliate nor denticulate.
- e. Base of the lip with linear-lanceolate arms; petals semi-terete above..... 9. *P. ARIETINA*
- ee. Base of the lip without lateral arms; petals not semi-terete.
- f. Base of lamina of the lip with a transverse E-shaped callus..... 6. *P. RHODOGLOSSA*
- ff. Base of the lamina of the lip without a transverse E-shaped callus..... 10. *P. HOMOLANTHA*
- bb. Leaves not distinctly cordate at the base, usually attenuated.
- c. Secondary stems winged..... 25. *P. ALPINA*
- cc. Secondary stems not winged.
- d. Lateral sepals free at least above the middle, usually nearly to their bases.
- e. Ovary echinate..... 20. *P. TRIBULOIDES*
- ee. Ovary not echinate.
- f. Petals abruptly dilated at the base..... 15. *P. TRACHYCHLAMYS*
- ff. Petals not abruptly dilated at the base.
- g. Lip simple..... 18. *P. OCTOMERIAE*
- gg. Lip with small falcate lateral lobes above the base..... 19. *P. UNCINATA*
- dd. Lateral sepals connate to their apices or nearly so.



- e. Lip deeply saccate-concave..... 12. *P. CONCAVIFLORA*  
 ee. Lip not saccate-concave.  
 f. Petals serrulate (or ciliate).  
 g. Dorsal sepal suborbicular; lip not *Stelis*-like..... 13. *P. COBRAEFORMIS*  
 gg. Dorsal sepal lanceolate; lip *Stelis*-like..... 11. *P. SIMULANS*  
 ff. Petals entire (sometimes ciliolate).  
 g. Sepals forming a distinct tube at the base, hispidulous dorsally..... 21. *P. HISPIDA*  
 gg. Sepals not forming a distinct tube at the base, the dorsal free from the laterals, glabrous.  
 h. Ovaries echinate..... 20. *P. TRIBULOIDES*  
 hh. Ovaries not echinate.  
 i. Lip about as broad as long, with large basal lobes..... 14. *P. ALLENII*  
 ii. Lip longer than broad, simple or at least not with large basal lobes.  
 j. Pedicels of the flowers less than  $\frac{1}{4}$  as long as the leaves..... 17. *P. RUSCIFOLIA*  
 jj. Pedicels of the flowers at least half as long as the leaves..... 16. *P. EUMECOCAULON*  
 aa. Inflorescence a few- to several-flowered raceme.  
 b. Secondary stems less than half as long as the leaves they bear.  
 c. Sepals pubescent within..... 46. *P. SEGOVIENSIS*  
 cc. Sepals glabrous within.  
 d. Inflorescence a fascicle of short racemes, much shorter than the subtending leaf..... 36. *P. STENOSTACHYA*  
 dd. Inflorescence a single raceme nearly as long as the subtending leaf..... 37. *P. OVATILABIA*  
 bb. Secondary stems at least half as long as the leaves that they bear.  
 c. Petals linear or linear-lanceolate, entire.  
 d. Lip lepidote-verrucose above..... 28. *P. LEPIDOTA*  
 dd. Lip not lepidote-verrucose above..... 42. *P. PRUINOSA*  
 cc. Petals broader than linear or linear-lanceolate (or if not then serrulate), entire or serrulate.  
 d. Petals very strongly recurved-arcuate; denticulate..... 33. *P. ROWLEEI*  
 dd. Petals not strongly recurved-arcuate; denticulate or entire.  
 e. Lip broader than long, transversely elliptic..... 34. *P. PRAEGRANDIS*  
 ee. Lip not broader than long nor transversely elliptic.  
 f. Lip with small lateral lobes near the middle.  
 g. Secondary stems with prominent wings.  
 (Cf. also *P. VELATICAULIS*)  
 h. Dorsal sepal 9–11 mm. long, elliptic-obovate..... 29. *P. COGNIAUXIANA*  
 hh. Dorsal sepal 6–6.5 mm. long, elliptic to oblong-oblancheolate..... 25. *P. ALPINA*  
 gg. Secondary stems wingless.  
 h. Petals denticulate, obovate..... 30. *P. VITTATA*  
 hh. Petals not denticulate, oblong to oblong-oblancheolate..... 31. *P. VELATICAULIS*  
 ff. Lip without lateral lobes near the middle.  
 g. Petals not serrulate.  
 h. Lip with erect auricles near the middle; petals oblong to oblong-oblancheolate..... 31. *P. VELATICAULIS*  
 hh. Lip without erect auricles near the middle; petals oblong-obovate to subrhombic..... 32. *P. GELIDA*  
 gg. Petals serrulate at least in part.  
 h. Lateral sepals connate to their apices; petals elliptic to elliptic-lanceolate..... 35. *P. ELLIPSOPHYLLA*  
 hh. Lateral sepals free for at least  $\frac{1}{3}$  their length; petals broader than elliptic or elliptic-lanceolate.  
 i. Petals oblong-oblancheolate..... 27. *P. VERECUNDA*  
 ii. Petals subrhombic-obovate..... 26. *P. PTEROCAULIS*
- Series III. *ELONGATAE*.—A series of species not necessarily closely allied but having the elongated inflorescence in common. Plants in which the inflorescence exceeds the subtending leaves in length. Inflorescence a single-flowered to a many-flowered raceme or a fascicle of flowers on an elongated peduncle.  
 a. Inflorescence a 1- to several-flowered fascicle on a long peduncle.



- b. Lateral lobes of the lip erect; lamina with a pair of parallel lamellate calluses near the middle..... 23. *P. FULGENS*
- bb. Lateral lobes of the lip, if present, not erect; lamina without parallel lamellate calluses.
- c. Peduncle puberulent..... 24. *P. GLANDULOSA*
- cc. Peduncle glabrous..... 22. *P. BRIGHAMII*
- aa. Inflorescence a raceme.
- b. Peduncle ancipitous and winged.
- c. Apex of the lip obtuse or retuse..... 50. *P. SPECTABILIS*
- cc. Apex of the lip acute..... 49. *P. PFAVII*
- bb. Peduncle not ancipitous nor winged.
- c. Lateral sepals free nearly to their bases, at least not connate to near the middle.
- d. Ovary muricate..... 51. *P. MURICATA*
- dd. Ovary not muricate.
- e. Disc of the lip with 3 prominent longitudinal calluses..... 48. *P. DOLICHOPUS*
- ee. Disc of the lip without prominent longitudinal calluses.
- f. Sepals 10 mm. or more long..... 52. *P. CRENATA*
- ff. Sepals 19 mm. or less long.
- g. Petals fimbriate or lacerate-fimbriate..... 41. *P. ARISTATA*
- gg. Petals not as above.
- h. Lip narrowly oblong; lateral sepals acuminate..... 39. *P. CALYPTROSTELE*
- hh. Lip ovate; lateral sepals acute or obtuse..... 37. *P. OVATILABIA*
- cc. Lateral sepals connate to about the middle or usually to near their apices.
- d. Secondary stems less than half as long as the leaves they bear.
- e. Ovary echinate..... 40. *P. FUEGII* var. *ECHINATA*
- ee. Ovary not echinate.
- f. Petals fimbriate or lacerate-fimbriate..... 41. *P. ARISTATA*
- ff. Petals not fimbriate nor lacerate-fimbriate.
- g. Lip 3-lobed; sepals pubescent within..... 46. *P. SEGOVIENSIS*
- gg. Lip simple; sepals glabrous within..... 38. *P. GROBYI*
- dd. Secondary stems at least half as long as the leaves they bear.
- e. Petals linear or linear-lanceolate..... 42. *P. PRUINOSA*
- ee. Petals not linear nor linear-lanceolate, either lanceolate or oblong or broader.
- f. Petals truncate..... 43. *P. MACRANTHA*
- ff. Petals acute to obtuse or rounded but not truncate.
- g. Sepals pubescent within..... 46. *P. SEGOVIENSIS*
- gg. Sepals glabrous within.
- h. Lateral sepals 5-9 mm. long.
- i. Petals elliptic-lanceolate to ovate-lanceolate, 6-8.5 mm. long..... 47. *P. GHIESBREGHTIANA*
- ii. Petals oblong-obovate to subrhombic, 2.5-3.5 mm. long..... 32. *P. GELIDA*
- hh. Lateral sepals 12-25 mm. long.
- i. Lip with erect basal auricles or lobes; petals verrucose at the apex..... 44. *P. TUERCKHEIMII*
- ii. Lip without basal auricles or lobes; petals not verrucose at the apex..... 45. *P. POWELLII*
- Series IV. *RESTREPIAE*.—A small, natural group of species mainly distinguished by the clavellate apices of the dorsal sepal and the petals. Sheaths of the secondary stems usually maculate.
- a. Disc of the terminal part of the lip verrucose; inflorescence more than half as long as the leaves.
- b. Pedicel with a short filamentose appendage on the anterior side just below the ovary..... 53. *P. FILAMENTOSA*
- bb. Pedicel without an appendage..... 54. *P. SUBSERRATA*
- aa. Disc of the terminal part of the lip not verrucose; inflorescence less than half as long as the leaf..... 55. *P. XANTHOPHTHALMA*

1. *PLEUROTHALLIS BROADWAYI* Ames, Orch. 2:267. 1908; C. Schweinf. in Bot. Mus. Leaf. Harv. Univ. 8:41. 1940.

*Pleurothallis Williamsii* Ames, Orch. 7:120. 1922; Sched. Orch. 7:31, t. 15. 1924.  
*Pleurothallis Broadwayi* var. *tricarinata* C. Schweinf. loc. cit. 42.



Small, caespitose, epiphytic herbs up to about 15 cm. tall. Secondary stems up to about 6 cm. long, slender, bearing 1–3 leaves. Inflorescence exceeding the leaves; peduncle sub-filiform, rachis somewhat fractiflex. Leaves 0.6–1.6 cm. long and 0.3–0.8 cm. broad, elliptic-oval to obovate, obtuse, short-petiolate. Dorsal sepal 3.5–6 mm. long and 1.2–2 mm. broad, lanceolate to ovate-lanceolate, acute or acuminate, somewhat cucullate. Lateral sepals 3–5.5 mm. long and 0.6–1.2 mm. broad, free almost to the base, lanceolate, acute or acuminate, oblique. Petals 1.1–1.5 mm. long and 0.6–0.8 mm. broad, oval to obovate, obtuse, slightly oblique, short-clawed. Lip 1–2 mm. long and 0.7–1.1 mm. broad, elliptic-ovate, obtuse, sometimes obscurely trilobate, the lamina bi-tricarinate, papilliferous, the apex thickened.

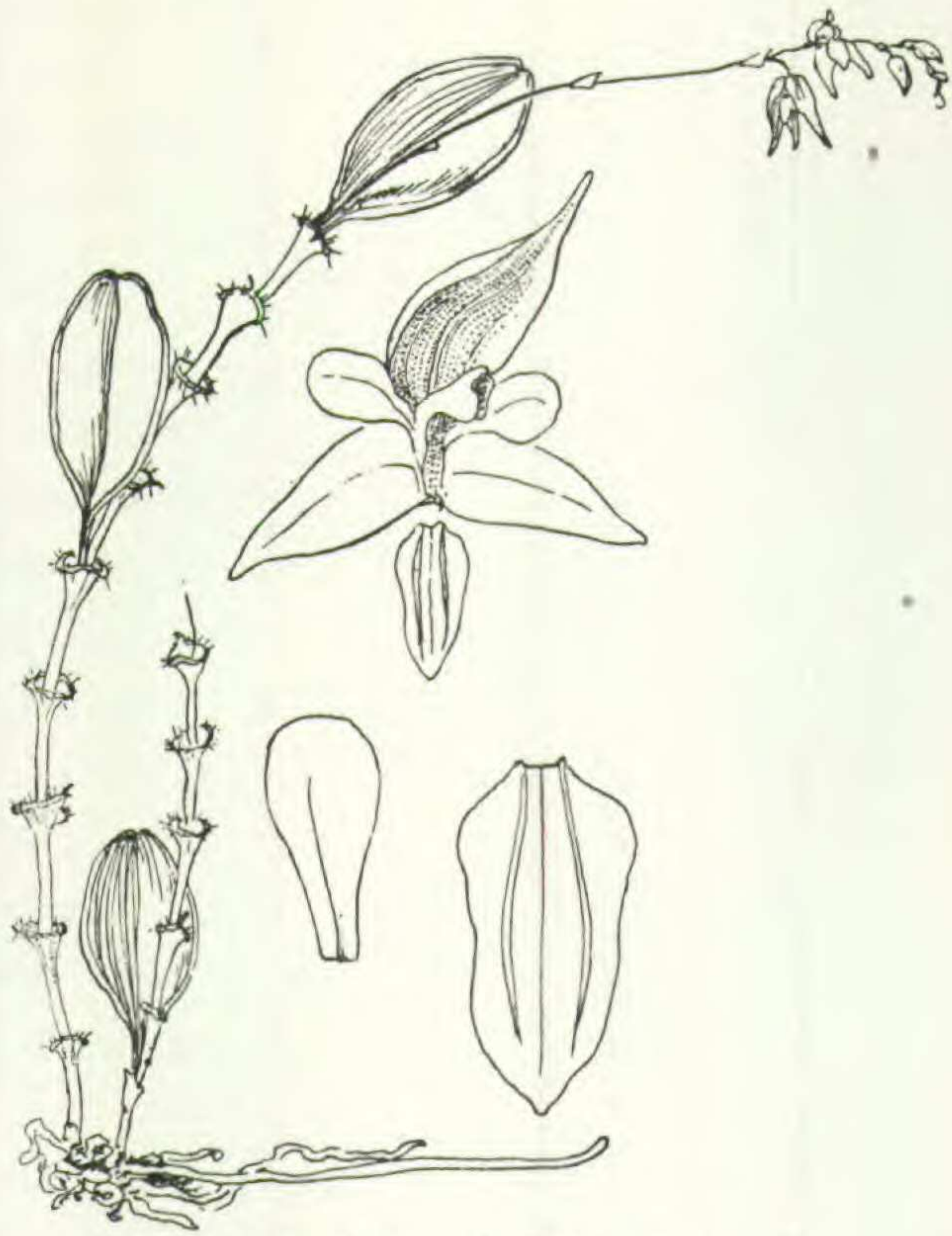


Fig. 96. *Pleurothallis Broadwayi*

Mexico, Honduras, Costa Rica, Panama, and the West Indies.

DARIÉN: Cana and vicinity, alt. about 600–1950 m., *Williams 976*.

2. *PLEUROTHALLIS GNOMONIFERA* Ames, Sched. Orch. 6:61. 1923.

*Pleurothallis brevis* Schltr. in Fedde Rep. Sp. Nov. Beih. 19:183. 1923.

Small, caespitose, epiphytic herbs up to 12 cm. tall. Secondary stems up to about 8 cm. long, covered with infundibuliform, hispidulous sheaths. Leaves 1.4–4.5 cm. long and 0.6–2 cm. broad, elliptic to ovate, acute or obtuse, coriaceous, attenuated into a short petiole at the base. Inflorescence one to several racemes from the axil of the leaf, usually less than half as long as the leaves, few-flowered. Sepals glandular-pubescent dorsally; dorsal sepal about 3–4 mm. long and 1 mm. broad, oblong-lanceolate, acute or obtuse; lateral sepals 3–4 mm. long and together 2.5–3 mm. broad, connate at the base or as far as the middle, free parts oblong, obtuse. Petals about 1.5 mm. long and 0.5 mm. broad, oblong, obtuse, ciliate or lacerate at the apex. Lip 1.6–2 mm. long and 0.5–0.6 mm. broad, narrowly oblong, obtuse, subpandurate, biauriculate at the base, with a small submammillate callus near the base of the disc.

Costa Rica and Panama.

CHIRIQUÍ: Cerro Punta to headwaters of the Río Caldera, alt. 2250–2500 m., *Allen 1466*; Cerro Horqueta, alt. 1500–1800 m., *Powell 311*.



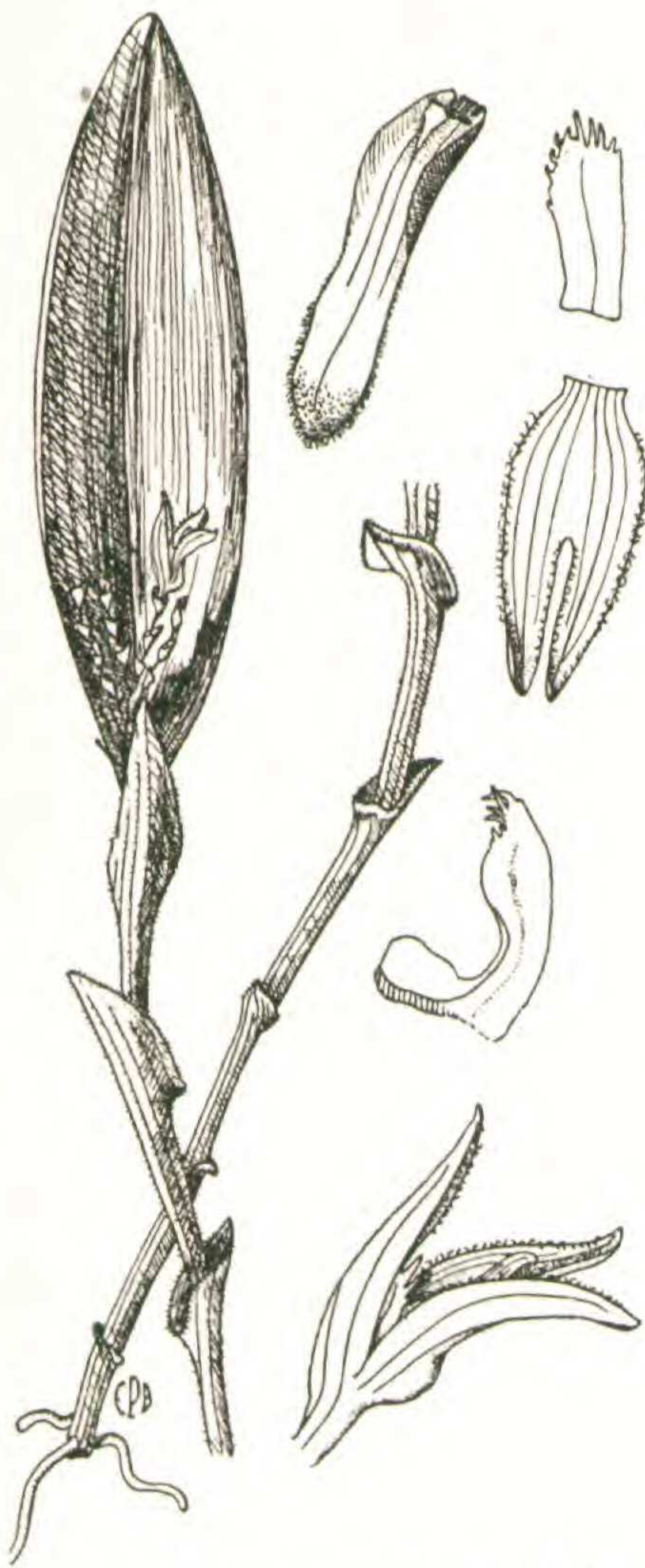


Fig. 97. *Pleurothallis Blaisdellii*

3. *PLEUROTHALLIS BLAISDELLII* S. Wats. in Proc. Am. Acad. 23:284. 1888.

*Pleurothallis peraltensis* Ames, Sched. Orch. 6:65. 1923; loc. cit. 7: t. II, figs. 1-5. 1924.

Small, caespitose, epiphytic herbs up to about 15 cm. tall. Secondary stems up to 10 cm. long, covered with several more or less pubescent, loose sheaths which disintegrate with age. Leaves 2-6.5 cm. long and 0.4-2 cm. broad, narrowly elliptic to oval, acute or obtuse, coriaceous, attenuated into a short petiole at the base. Inflorescence a raceme or fascicle of racemes, short, usually less than half as long as the leaves, few-flowered. Dorsal sepal 4-6 mm. long and 1.5-2 mm. broad, lanceolate to oblong-lanceolate, acute, usually eciliate. Lateral sepals 4-6 mm. long and together 2.5-3 mm. broad, connate at the bases or nearly to the middle, free portions oblong-lanceolate, acute or obtuse, usually ciliate toward the base on the outer side. Petals 2-2.5 mm. long and 1-1.5 mm. broad, oblong, obtuse, apical part ciliate or fimbriate. Lip 2.5-3 mm. long and 0.75-1 mm. broad, oblong-lanceolate or oblong-pandurate, obtuse, ciliate, auriculate at the base, short-unguiculate.

Mexico, British Honduras, Honduras, Costa Rica, and Panama.

CHIRIQUÍ: Bajo Chorro, alt. about 1800 m., *Davidson 169*; "Chiriquí Province," alt. about 1200 m., *Powell 424*.

4. *PLEUROTHALLIS ROTUNDATA* C. Schweinf. in Bot. Mus. Leafl. Harv. Univ. 4:115. 1937.

Small, caespitose, epiphytic herbs up to about 13 cm. tall. Secondary stems up to about 9 cm. long, slender, covered with several hispid, infundibuliform sheaths. Leaves 2.5-4.5 cm. long and 2-3.7 cm. broad, broadly oval to sub-orbicular-ovate, obtuse, with a very short petiole, the margins sphacelate and rolled toward the dorsal surface. Inflorescence a fascicle of 1(-few?)-flowered racemes, shorter than the leaves. Dorsal sepal 4.5-5.5 mm. long and 1.5-2.1 mm. broad, lanceolate, acute or acuminate, ciliate or eciliate. Lateral sepals about 5 mm. long and together 2.5-3 mm. broad, ovate-lanceolate, connate to about the middle, free apices fleshy-thickened, ciliate laterally toward the base and near the sinus within. Petals about 1.5 mm. long and 0.75 mm. broad, oblong or oblong-obovate, obtuse, the apex ciliate-lacerate. Lip 2.5-3 mm. long and 0.8-1 mm. broad, lanceolate to ligulate-lanceolate, acute or acuminate, ciliolate, short-unguiculate.



Endemic to Panama.

COCLÉ: vicinity of El Valle, alt. 600–1000 m., *Allen 1242*; north rim of El Valle de Antón, alt. 600–1000 m., *Allen 1676*; hills north of El Valle de Antón, alt. about 1000 m., *Allen 2206, 2259*; mountains beyond La Pintada, alt. 400–600 m., *Hunter & Allen 561*.

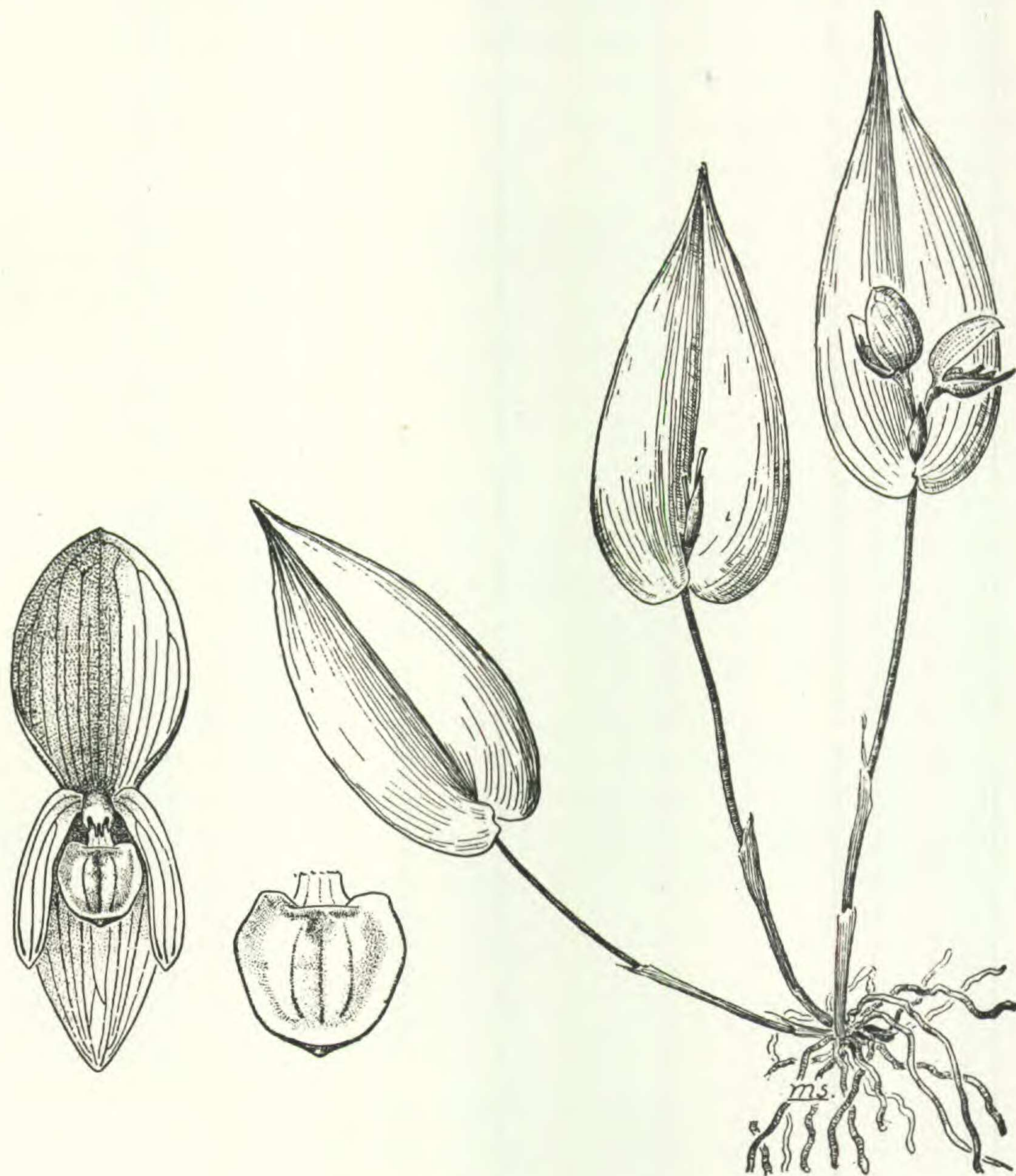


Fig. 98. *Pleurothallis cardiochila*

5. PLEUROTHALLIS CARDIOCHILA L. Wms. in Ann. Missouri Bot. Gard. 29:343. 1942.

Small, caespitose, epiphytic herbs up to about 21 cm. tall. Secondary stems up to about 11 cm. long, slender, with 1–2 loose chartaceous sheaths toward the base, naked above. Leaves 9–10 cm. long and 3.6–3.9 cm. broad, lanceolate-cordate, acuminate, coriaceous. Inflorescence a 1(–few?)-flowered fascicle subtended by a chartaceous sheath about 1–1.5 cm. long, much shorter than the leaves. Flowers very large for the group, yellowish with the dorsal sepal tinged with dark red, lip



deep orange. Dorsal sepal about 20 mm. long and 12.5 mm. broad, oblong-oval, obtuse, with 7-9 principal nerves, strongly cucullate. Lateral sepals connate to their apices, about 18 mm. long and 10 mm. broad, ovate, acute, with 7-9 principal nerves. Petals about 13 mm. long and 2.5 mm. broad, linear-oblong, acute, arcuate, subauriculate on the posterior margin at the base, entire, 3-nerved at the base, the posterior nerve short, the anterior nerve branched near the base, hence the apical part of the petal 3-nerved. Lip unguiculate; lamina about 6 mm. long and 5.5 mm. broad, suborbicular-cordate, obtuse, callus thickened along the basal sinus and below the subapiculate apex, 3-nerved; claw about 2 mm. long, oblong.

Endemic in Panama.

CHIRIQUÍ: Bajo Chorro, alt. about 1800 m., *Davidson 119*.

*Pleurothallis cardiochila* is most closely allied to *P. palliolata* Ames, from which it is distinguished by the suborbicular-cordate lip and the 3-nerved, entire petals.

6. PLEUROTHALLIS RHODOGLOSSA Schltr. in Fedde Rep. Sp. Nov. Beih. 17:22. 1922.

Small, caespitose, epiphytic herbs up to about 2 dm. tall. Secondary stems up to about 13 cm. long, slender, with 1-2 sheaths at the base, otherwise naked. Leaves 4-7 cm. long and 2.2-4 cm. broad, broadly ovate-cordate, acute or acuminate, coriaceous. Flowers rather small, greenish with a purple lip. Dorsal sepal about 3.5-4 mm. long and 1.8-2.2 mm. broad, oblong-obovate, obtuse, 3-nerved. Lateral sepals about 3 mm. long and 3 mm. broad, orbicular, connate to the apices. Petals about 2-2.5 mm. long and 0.5-0.7 mm. broad, linear-ligulate, acute, slightly arcuate, obscurely denticulate (ciliolate, fide Schltr.). Lip about 1.4-1.7 mm. long and 1.1-1.3 mm. broad, cordate or narrowly cordate, obtuse; lamina fleshy and with a transverse E-shaped callus toward the base (open part of the "E" toward the base).

Panama.

CHIRIQUÍ: "Province of Chiriquí," alt. 1200 m., *Powell 182*. (Schlechter in his description cites *Powell 182* but gives the locality as "Auf Hügeln bei Panama-city").

Two specimens of this have been seen. The one in the Ames Herbarium gives the data cited above. The specimen in the Herbarium of the Missouri Botanical Garden bears the data given by Schlechter. The Chiriquí locality is doubtless correct.

7. PLEUROTHALLIS TRIANGULABIA C. Schweinf. in Ann. Missouri Bot. Gard. 24:183. 1937.

Caespitose epiphytic herbs up to about 4 dm. tall. Secondary stems up to about 3 dm. long, slender, with loose sheaths which soon disintegrate. Leaves 3.5-12 cm. long and 1.3-6 cm. broad, oblong-cordate to ovate-cordate, acuminate, coriaceous. Inflorescence a 1- to few-flowered fascicle, the flowers rather large. Dorsal sepal 9-12 mm. long and 6-9 mm. broad, oblong-ovate to oval, acute or obtuse, larger than the combined laterals. Lateral sepals 9-12.5 mm. long and



together 5–8 mm. broad, ovate-lanceolate to broadly ovate, acute or obtuse, connate to their tips. Petals 6–8 mm. long and 1.5–2.1 mm. broad, elliptic-linear, acute, ciliate to lacerate-dentate, arcuate. Lip 3.2–4 mm. long and 3–4 mm. broad, triangular to triangular-subquadrate, surface verrucose, base truncate with a submammillate callus in the middle with cavities on either side.

Costa Rica and Panama.

CHIRIQUÍ: Cerro Punta to headwaters of the Río Caldera, alt. 2250–2500 m., *Allen 1468*; valley of the upper Río Chiriquí Viejo, alt. 1300–1900 m., *Seibert 269*; Bajo Chorro, alt. 1800 m., *Davidson 223*.

8. *PLEUROTHALLIS ANTONENSIS* L. Wms. in *Ann. Missouri Bot. Gard.* 29:341. 1942.

Caespitose epiphytic herbs up to about 3 dm. tall. Secondary stems slender, with one or two scarious sheaths at the base, naked above. Leaves 4–9 cm. long and 1.5–4.7 cm. broad, lanceolate-cordate to broadly cordate (juvenile leaves elliptic), acute or acuminate, coriaceous. Inflorescence a 1- to several-flowered fascicle from the apex of the secondary stems, much shorter than the subtending leaves. Dorsal sepal 6–7.5 mm. long and 3–4 mm. broad, elliptic-obovate, obtuse or acute, 3-nerved. Lateral sepals connate to their apices, 5.5–7 mm. long and 4–5 mm. broad, ovate to broadly ovate, obtuse or acute, 6-nerved. Petals 3.8–4.5 mm. long and 0.6–1 mm. broad, linear-oblong, acute, serrulate, strongly arcuate, 1-nerved. Lip unguiculate; lamina 2.5–3 mm. long and 2–2.5 mm. broad, cordate to oblong-cordate, denticulate, fleshy, the surface obscurely verrucose or smooth, with a small central cavity near the base; claw short.

Endemic in Panama.

COCLÉ: hills north of El Valle de Antón, alt. about 1000 m., *Allen 2156*; same locality, *Allen 2194, 2267, 2701*; mountains beyond La Pintada, alt. about 400–600 m., *Hunter & Allen 594*.

Specimens of *Pleurothallis antonensis* have been referred to *P. phyllocardia* Reichb. f., a rather obscure and poorly described species.

9. *PLEUROTHALLIS ARIETINA* Ames, *Sched. Orch.* 4:16. 1923; *loc. cit.* 7: *t. 16*. 1924.

Caespitose epiphytic herbs up to 3.5 dm. tall. Secondary stems up to 2.5 dm. long, slender, ancipitous or winged, at least when dry, with one or more basal sheaths, naked above. Leaves 6–13 cm. long and 1.5–3.5 cm. broad, lanceolate to ovate-lanceolate, acute or acuminate, cordate at the base when mature, coriaceous. Inflorescence a fascicle of 1–several, rather long-pedicellate flowers, shorter than the leaves. Dorsal sepal 9–10 mm. long and 2.5–4 mm. broad, oblong to oblong-lanceolate, obtuse, cucullate, fleshy. Lateral sepals 9–10 mm. long and together 2–4 mm. broad, oblong or oblong-lanceolate, obtuse, cucullate, fleshy, connate to their apices. Petals 7–10 mm. long and 1.4–1.8 mm. broad, linear-oblong or linear-lanceolate, obtuse, attenuated into a thin claw at the base, the apical half semi-terete. Lip 1.5–2.5 mm. long and 2–3 mm. broad when expanded, triangular-crescentiform and with two linear-lanceolate arms at the base, the





Fig. 99. *Pleurothallis arietina*

(200)



whole when spread out suggesting a ram's head.

Costa Rica and Panama.

CHIRIQUÍ: Cerro Horqueta, alt. 1500–1660 m., *Powell 288*. COCLÉ: mountains beyond La Pintada, alt. 400–600 m., *Hunter & Allen 595*.

10. PLEUROTHALLIS HOMOLANTHA Schltr. in Fedde Rep. Sp. Nov. Beih. 19:106. 1923.

*Pleurothallis nemorum* Schltr. loc. cit. 191.

Small, caespitose, epiphytic herbs up to about 3.5 dm. tall. Secondary stems up to about 23 cm. long, slender, with one or more sheaths toward the base, naked above. Leaves 3.5–10 cm. long and 0.9–3.5 mm. broad, elliptic-lanceolate to ovate, cordate at the base, acute or acuminate. Inflorescence a fascicle of 1–few flowers, much shorter than the leaves. Dorsal sepal 6–10 mm. long and 3–4.5 mm. broad, elliptic-oblong to elliptic-obovate, acute. Lateral sepals connate to their apices, 6–10 mm. long and 3.5–6 mm. broad, lanceolate-ovate to ovate, acute, somewhat cucullate. Petals 3.5–5 mm. long and 0.5–1 mm. broad, elliptic-linear, acute, arcuate, glabrous. Lip unguiculate; lamina 2–3.5 mm. long and 1.5–3 mm. broad, oblong-cordate, obtuse (rarely acutish), fleshy.

Costa Rica and Panama.

CHIRIQUÍ: valley of the upper Río Chiriquí Viejo, *White & White 80*. COCLÉ: El Valle, alt. 600–1000 m., *Allen 1236*.

11. PLEUROTHALLIS SIMULANS L. Wms. in Ann. Missouri Bot. Gard. 27:281, pl. 33, figs. 8–10. 1940.

Small, caespitose, epiphytic herbs up to about 10 cm. tall. Secondary stems 2.5–6 cm. long, slender, usually a little longer than the leaves, with one or two sheathing bracts at the base. Leaves 3–5 cm. long and 0.5–0.8 cm. broad, ligulate to elliptic-oblongate, obtuse, coriaceous, submarginate. Inflorescence 1-flowered or a few-flowered fascicle, shorter than the subtending leaf. Dorsal sepal about 10 mm. long and 3.5–4 mm. broad, lanceolate, acuminate. Lateral sepals connate to their apices, about 10 mm. long and 4.5–5 mm. broad, broadly lanceolate, acuminate. Petals 5–6 mm. long and 2–2.5 mm. broad, broadly elliptic to subrhombic, acute or acuminate, lacerate-ciliate nearly to the base. Lip 3–3.5 mm. long and 2–2.5 mm. broad, simple, subcordate in outline, acuminate, the anterior margin somewhat serrulate, the disc covered with a thick callus simulating that found in species of *Stelis*; the callus with an anterior rim, an inconspicuous depression toward its apex and sharply declined to the attachment of the lip.

Panama.

COCLÉ: north rim of El Valle de Antón, *Allen 1912*; trail to Las Minas, hills north of El Valle de Antón, *Allen 2749*.

An interesting and conspicuous species of *Pleurothallis* because of the unusual structure of the lip.



Fig. 100. *Pleurothallis simulans*

12. PLEUROTHALLIS CONCAVIFLORA C. Schweinf. in Bot. Mus. Leafl. Harv. Univ. 4:114. 1937; L. Wms. in Ann. Missouri Bot. Gard. 28:416. 1941.

Small, caespitose, epiphytic herbs up to about 11 cm. tall. Secondary stems up to about 7 cm. long, slender. Leaves 2.5–4 cm. long and 0.7–1.5 cm. broad, elliptic-oblong, obtuse or acute, coriaceous. Inflorescence a fascicle of 1- to several-flowered peduncles. Sepals obscurely puberulent or glabrous within. Dorsal sepal 4–5 mm. long and 2.5–3.3 mm. broad, oblong-ovate to oblong-obovate, acute or obtuse, cucullate, fleshy. Lateral sepals connate to their apices, about 4.5 mm. long and 4–5 mm. broad, ovate-suborbicular to suborbicular, cucullate, obtuse or acute. Petals 1.7–2.5 mm. long and 0.6–0.9 mm. broad, linear-oblong to elliptic-oblong, acute or obtuse. Lip 2–2.5 mm. long and 1–1.5 mm. deep, 3-lobed or at least the base produced into prominent retrorse auricles, saccate-



concave, apiculate at the apex; lateral lobes or auricles retrorse or erect, triangular-lanceolate; the disc with a callus connecting the bases of the lobes or auricles.

Costa Rica and Panama.

COCLÉ: vicinity of El Valle de Antón, alt. about 600 m., *Allen 2058*; vicinity of La Mesa, alt. about 1000 m., *Allen 2317*.

This species seems to differ from *P. excavata* Schltr. only in having slightly smaller flowers. No material of *P. excavata* is available for study. The types of the two units are from the same locality in Costa Rica.

13. *PLEUROTHALLIS COBRAEFORMIS* L. Wms. in *Ann. Missouri Bot. Gard.* 27:277, *pl.* 34, *figs.* 7-14. 1940.

Small, caespitose, epiphytic herbs up to about 13 cm. tall. Secondary stems mostly up to 4-6 cm. long, slender, subequal to the leaves or a little longer.

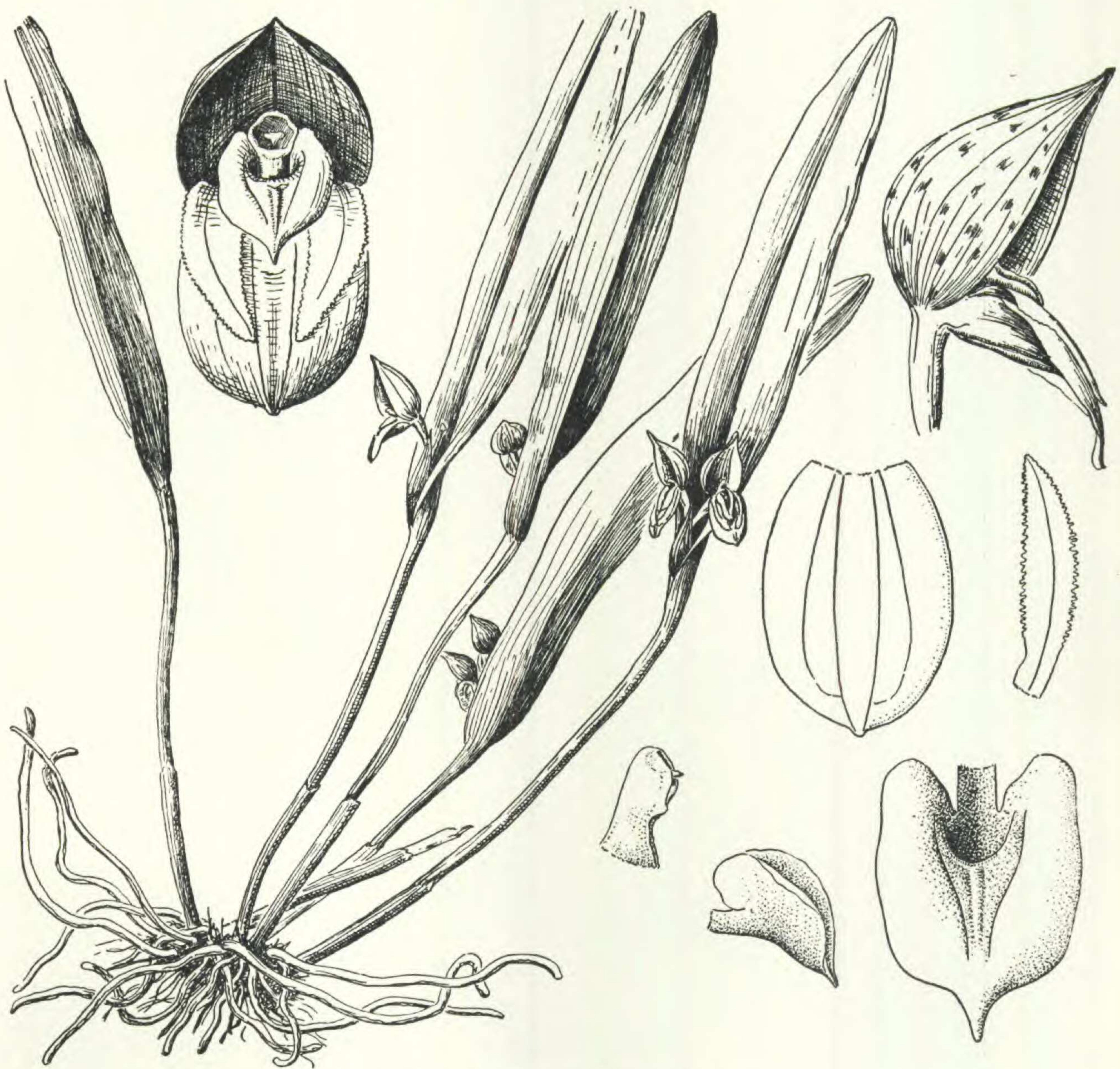


Fig. 101. *Pleurothallis cobraeformis*



Leaves 4–6 cm. long and 0.8–1.1 cm. broad when mature, obtuse or acute, fleshy. Inflorescence a 1- to several-flowered fascicle (or possibly an abbreviated raceme?), much shorter than the leaves. Dorsal sepal 8–10 mm. long and 7–9 mm. broad, suborbicular, subacute, strongly cucullate. Lateral sepals connate to their apices, about 6–7 mm. long and 4.5–5 mm. broad, broadly oval. Petals 4–6 mm. long and 1.2–2.5 mm. broad, elliptic, acute, arcuate, dentate-ciliate. Lip about 3.5 mm. long and as broad, short-clawed; lamina apiculate, broadly cordate, fleshy,



Fig. 102. *Pleurothallis Allenii*



sharply deflexed, the basal auricles rounded.

Panama.

COCLÉ: vicinity of El Valle de Antón, alt. about 600 m., *Allen 2057*.

14. *PLEUROTHALLIS ALLENI* L. Wms. in Ann. Missouri Bot. Gard. 27:275, *pl.* 33, *figs.* 5-7. 1940.

Small, caespitose, epiphytic herbs up to about 15 cm. tall. Secondary stems 3-6 cm. long, slender, shorter than the leaves, with one or two sheaths at the base. Leaves 5-9 cm. long and 0.3-0.6 cm. broad, ligulate to linear-ligulate, obtuse or tridentate, coriaceous. Inflorescence a 1- to several-flowered fascicle, shorter than the leaves, the flowers large for the size of the plant. Dorsal sepal about 15 mm. long and 4 mm. broad, lanceolate, long attenuate-acuminate. Lateral sepals connate nearly to their apices, about 15 mm. long and together about 5 mm. broad, lanceolate, acute. Petals about 12 mm. long and 3 mm. broad, lanceolate, acute or acuminate, slightly oblique. Lip about 4 mm. long and as broad, 3-lobed; the lateral lobes erect, about 1.25 mm. long and 1 mm. broad, broadly oblong, the apices rounded; the mid-lobe about 2 mm. long and 1.5 mm. broad at the base, narrowly triangular, acute; disc very fleshy, with a tripartite raised callus near the middle, and the mid-lobe covered with echinulate protuberances.

Panama.

COCLÉ: vicinity of El Valle de Antón, alt. 600-1000 m., *Allen 1240*; vicinity of La Mesa, alt. about 1000 m., *Allen 2338*.

15. *PLEUROTHALLIS TRACHYCHLAMYS* Schltr. in Fedde Rep. Sp. Nov. Beih. 17:23. 1922; Ames, Sched. Orch. 7:31, *t.* 19. 1924.

Small, repent, epiphytic herbs. Secondary stems up to about 6 cm. long, covered with scarios sheaths which are scurfy or at least verrucose. Leaves 4.5-7 cm. long and 0.4-1 cm. broad, elliptic to lanceolate, acute. Inflorescence a 1- to few-flowered fascicle. Dorsal sepal 4-5 mm. long and 1.5-1.8 mm. broad, ovate or oblong-lanceolate, acute. Lateral sepals 4-5 mm. long and about 1.5 mm. broad, free to the bases, oblong-lanceolate, acute. Petals about 4 mm. long and 1.5 mm. broad, lanceolate and abruptly expanded near the bases. Lip about 2 mm. long and 1 mm. broad, oblong-oval, obtuse, with 2 small, erect, lateral lobes near the middle, with a small callus at the base.

Costa Rica (?), Panama, and dubiously in Peru.

PANAMÁ: foothills east of Panama City, *Powell 215*.

16. *PLEUROTHALLIS EUMECOCAULON* Schltr. in Fedde Rep. Sp. Nov. Beih. 19:187. 1923; L. Wms. in Ann. Missouri Bot. Gard. 27:277. 1940.

Small, caespitose, epiphytic herbs up to about 2 dm. tall. Secondary stems slender, strict, with one or two sheaths. Leaves 2.5-7.5 cm. long and 0.4-1.3 cm. broad, linear, elliptic or usually lanceolate, acute, coriaceous. Inflorescence a fascicle of long (2-3 cm.)-pedicellate flowers; one or more short, scarios bracts



at the base. Dorsal sepal 5–7 mm. long and 2.5–3.5 mm. broad, lanceolate to ovate-lanceolate, acute or acuminate, cucullate. Lateral sepals connate to their apices, 4.5–5.5 mm. long and 2.5–3.5 mm. broad, broadly lanceolate to ovate-lanceolate, obtuse or acute, fleshy. Petals 4.5–5 mm. long and about 1–1.5 mm. broad, linear-lanceolate to lanceolate, acuminate, papilliferous, the acumination subterete. Lip 3–3.5 mm. long and 1.5–2 mm. broad, papilliferous to subciliate, lanceolate to oblong-ovate, acute, truncate at the base, slightly constricted above the middle, fleshy, with a small V-shaped excavation above the middle and with 3 raised lines on the dorsal surface.

COCLÉ: vicinity of El Valle, alt. 600–1000 m., *Allen 1237*; hills north of El Valle de Antón in the vicinity of La Mesa, alt. 1000 m., *Allen 2339*.

17. *PLEUROTHALLIS RUSCIFOLIA* (Jacq.) R. Br. in Aiton, Hort. Kew. ed. 2, 5:211. 1813; Ames in Bot. Mus. Leafl. Harv. Univ. 1<sup>9</sup>: t. p. 5. 1933.

*Epidendrum ruscifolium* Jacq. Enum. Pl. Carib. 29. 1760.

*Dendrobium ruscifolium* Sw. in Nova Acta Soc. Sci. Upsala 6:84. 1799.

*Pleurothallis glomerata* Ames, Sched. Orch. 4:21. 1923; loc. cit. 7: t. 10. 1924.

Caespitose, epiphytic herbs up to about 5 dm. tall but usually much smaller. Secondary stems up to about 4 dm. long, slender. Leaves 4–20 cm. long and 1–5 cm. broad, linear-lanceolate to elliptic to lanceolate-ovate, acute or acuminate, contracted into a short cucullate petiole at the base. Inflorescence a 1- to many-flowered fascicle. Dorsal sepal 6–10 mm. long and 1.3–3 mm. broad, narrowly to broadly lanceolate, cucullate. Lateral sepals 6–10 mm. long and together 2.5–3 mm. broad, lanceolate to ovate-lanceolate, cucullate, acuminate, connate to their apices. Petals 4–8 mm. long and 0.31 mm. broad, subfiliform to narrowly lanceolate, acute. Lip 1.5–2 mm. long and about 1.2–1.4 mm. broad, ovate to oblong-cordate or ovate-cordate, acute or acuminate.

Costa Rica and Panama, the West Indies, and South America. Reported from Guatemala and Salvador.

CHIRIQUÍ: Bajo Chorro, alt. 1800 m., *Davidson 262*. COCLÉ: hills north of El Valle de Antón, alt. 800–1000 m., *Allen 2269*; trail to Las Minas, hills north of El Valle de Antón, alt. 1000 m., *Allen 2872*.

This variable and widespread species is the generic type of *Pleurothallis*.

18. *PLEUROTHALLIS OCTOMERIAE* Schltr. in Fedde Rep. Sp. Nov. Beih. 17:21. 1922.

*Pleurothallis cerea* Ames, Sched. Orch. 4:19. 1923; loc. cit. 7:26, fig. 4 and t. 8. 1924.

Erect, caespitose, epiphytic herbs up to about 5 dm. tall. Secondary stems up to about 3 dm. long and 0.4 cm. in diameter, covered with closely appressed sheaths which may be scurfy, the sheaths disintegrating with age. Leaves 4–20 cm. long and 0.8–6 cm. broad, narrowly elliptic to broadly lanceolate, acute or obtuse, coriaceous. Inflorescence a few- to many-flowered fascicle. Dorsal sepal 5.5–8 mm. long and 2–3 mm. broad, lanceolate to oblong-lanceolate, obtuse. Lateral sepals 4.5–7 mm. long and 2–2.8 mm. broad, broadly lanceolate, obtuse.



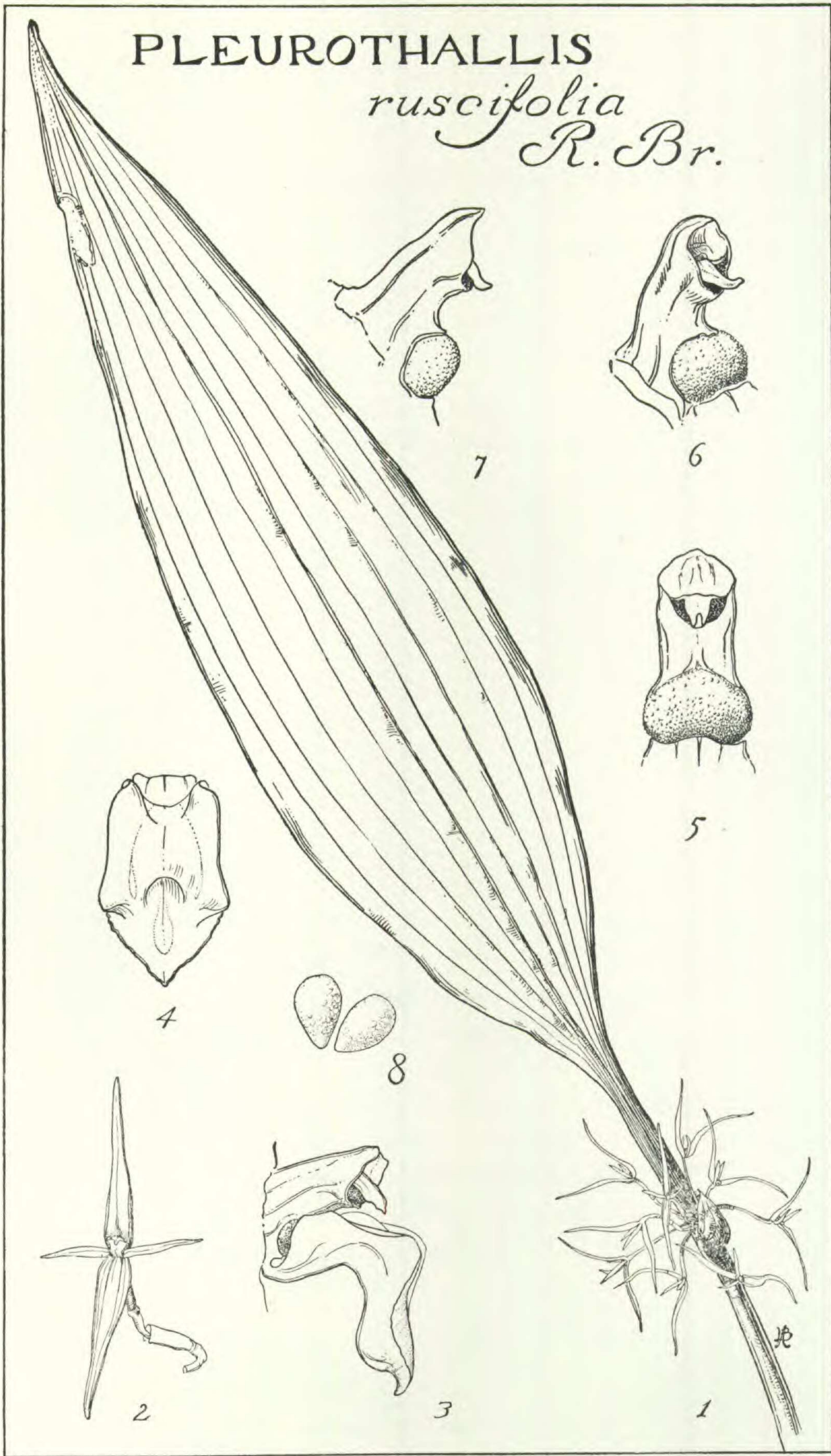


Fig. 103. *Pleurothallis ruscifolia*



or acute, usually arcuate, connate at the base and forming a short mentum. Petals 4–8 mm. long and 1.5–2.2 mm. broad, lanceolate, obtuse or acute, somewhat arcuate. Lip 2–3 mm. long and 0.8–1.3 mm. broad, oblong to oblong-ovate, obtuse, short-clawed, with 2 submarginal, elongated, sublamellate calluses which are about as long as the lip.

Costa Rica and Panama; possibly also Honduras.

CHIRIQUÍ: "Province of Chiriquí," *Powell* 252, 3432. COCLÉ: hills north of El Valle de Antón, alt. 1000 m., *Allen* 2719. PANAMÁ: hills above Campana, alt. 600–800 m., *Allen* 1881.

*Allen* 2719 consists of a fine series of plants which show that *P. cerea* is only a robust phase of *P. octomeriae*.

19. PLEUROTHALLIS UNCINATA Fawc. in Jour. Bot. 33:12. 1895; Fawc. & Rendle, Fl. Jam. 1:63, t. 10. 1910; C. Schweinf. in Bot. Mus. Leaflet. Harv. Univ. 7:151. 1939.

*Pleurothallis Alexandrae* Schltr. in Fedde Rep. Sp. Nov. Beih. 19:103. 1923.

Tall, rather coarse, subcaespitose, epiphytic herbs up to 5.5 dm. tall. Secondary stems up to about 3.5 dm. long, covered with several loose, ancipitous, chartaceous sheaths which soon disintegrate. Leaves 8–22 cm. long and 1–5 cm. broad, linear-elliptic to oblong-lanceolate, acute, coriaceous. Inflorescence a 1- to few-flowered fascicle with the flowers on long pedicels. Dorsal sepal 10–20 mm. long and 4–6 mm. broad, linear-oblong to oblong, acute or obtuse, puberulent dorsally. Lateral sepals 12–20 mm. long and 3–4 mm. broad, linear-lanceolate to oblong-lanceolate, acute, puberulent on both sides. Petals 5–9 mm. long and 1.3–2.5 mm. broad, oblong-ovate, acuminate, denticulate above, 3-nerved. Lip 6–8 mm. long and 2.5–3 mm. broad, oblong-ovate, usually subpandurate, obtuse, with two narrow, falcate lateral lobes above the base, typically with thick calluses near the base of the lateral lobes and without a retrorse callus at the base. (Cf. note below.)

Costa Rica, Panama, and the West Indies.

CHIRIQUÍ: Boquete, alt. about 1800 m., *Davidson* 220 (sterile specimen). COCLÉ: Valle de Antón, alt. about 800 m., *Cope* s. n.

Schweinfurth, loc. cit., has reduced *P. Alexandrae* Schltr. to *P. uncinata* without comment. Adequate material may prove that it is distinct and that the Cope specimen should be referred there. The lip on the Cope specimen is relatively small, has a prominent retrorse callus at the base (which typical *P. uncinata* lacks), and is membranaceous at the base of the side lobes (while in *P. uncinata* a large callus is situated at the base of each of the side lobes).

20. PLEUROTHALLIS TRIBULOIDES (Sw.) Lindl. Gen. & Sp. Orch. Pl. 6. 1930.

*Epidendrum tribuloides* Sw. Nov. Gen. & Sp. Pl. Prodr. 123. 1788.

*Pleurothallis fallax* Reichb. f. in Bonplandia 3:224. 1855.

*Cryptophoranthus acaulis* Kränzl. in Fedde Rep. Sp. Nov. Beih. 34:232. 1925.

Small, caespitose, epiphytic herbs up to 8 cm. tall. Secondary stems about 1



cm. long, covered with loose, chartaceous bracts, slender. Leaves 2–7 cm. long and 0.4–1.4 cm. broad, narrowly to broadly oblanceolate, obtuse, attenuated into a petiole at the base, coriaceous. Inflorescence a fascicle of 1–few brick-red flowers. Dorsal sepal 5–7 mm. long and 2–2.2 mm. broad, oblong-lanceolate or oblong-oblanceolate, acute, papilliferous, constricted just above the base. Lateral sepals often connate to their apices, 4.5–7.5 mm. long and about 3 mm. broad, oblong or oblong-lanceolate, acute, cucullate, papilliferous. Petals 2.5–3 mm. long and 1.2–1.4 mm. broad, oblong-oblanceolate, oblique, lobulate, acute, fleshy especially toward the apex. Lip 2.5–3 mm. long and 0.7–1.5 mm. broad, oblong or oblong-lanceolate, lobulate below the middle, obscurely ciliate toward the apex. Capsule echinate.

Mexico, British Honduras, Guatemala, Honduras, Costa Rica, Panama, and the West Indies.

CHIRIQUÍ: banks of Caldera River, alt. 1360 m., *Powell* 237, 3376.

21. *PLEUROTHALLIS HISPIDA* L. Wms. in *Ann. Missouri Bot. Gard.* 27:277, *pl.* 33, *figs.* 1–4. 1940.

*Cryptophoranthus Powellii* Ames, *Sched. Orch.* 4:8. 1925, non *Pleurothallis Powellii* Schltr.

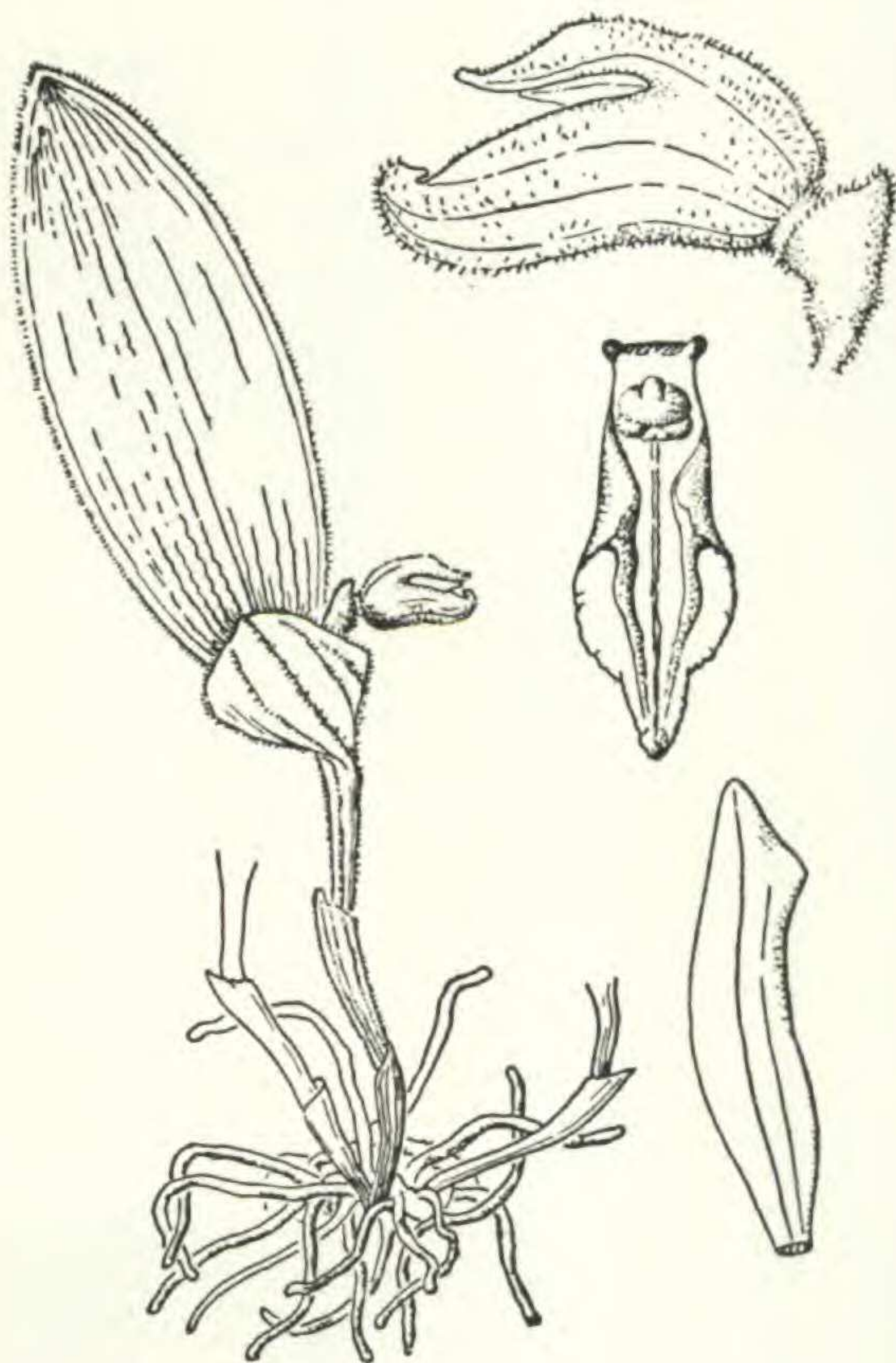


Fig. 104. *Pleurothallis hispida*

Small, caespitose, epiphytic herbs up to about 5 cm. tall. Secondary stems 0.5–2 mm. long, shorter than the leaves, with 2 or 3 cauline bracts, the upper infundibuliform, maculate with maroon dots and hispid at least along the angles. Leaves 1–3.5 cm. long and 0.3–1.3 mm. broad, narrowly elliptic to elliptic-oval, obtuse, coriaceous, margins hispid or hispidulous. Inflorescence a one- to few-flowered fascicle. Dorsal sepal connate with the laterals for half its length, 5–6 mm. long, lanceolate, acute, hispidulous dorsally. Lateral sepals about 6 mm. long and together about 6 mm. broad, connate to their tips, strongly cucullate, in natural position calceolate, carinate, hispidulous dorsally and papillose within. Petals about 4 mm. long and 1 mm. broad, linear-oblong, the apex obliquely truncate and acute. Lip about 3 mm. long and 1.5 mm. broad, unguiculate; lamina oblong-lanceolate, with a lamellate callus extending from each lateral



angle toward the apex and with a mammillate callus at the junction of the lamina and the claw, apical margins entire or denticulate; claw about 0.5 mm. long, minutely biauriculate at the base.

Endemic in Panama.

COCLÉ: vicinity of El Valle, alt. 600–1000 m., *Allen* 782, 1243. PANAMÁ: San Juan, *Powell* 278.

22. *PLEUROTHALLIS BRIGHAMII* S. Wats. in *Proc. Am. Acad.* 23:285. 1888; *Ames, Sched. Orch.* 7:19, t. 7. 1924.

*Pleurothallis barboselloides* Schltr. in *Fedde Rep. Sp. Nov. Beih.* 17:18. 1922; loc. cit. 59: t. 29, fig. 113. 1931.

*Pleurothallis periodica* Ames, loc. cit. 7:21, t. 4. 1924.  
*Pleurothallis acrisepala* Ames & Schweinf. *Sched. Orch.* 8:22. 1925.

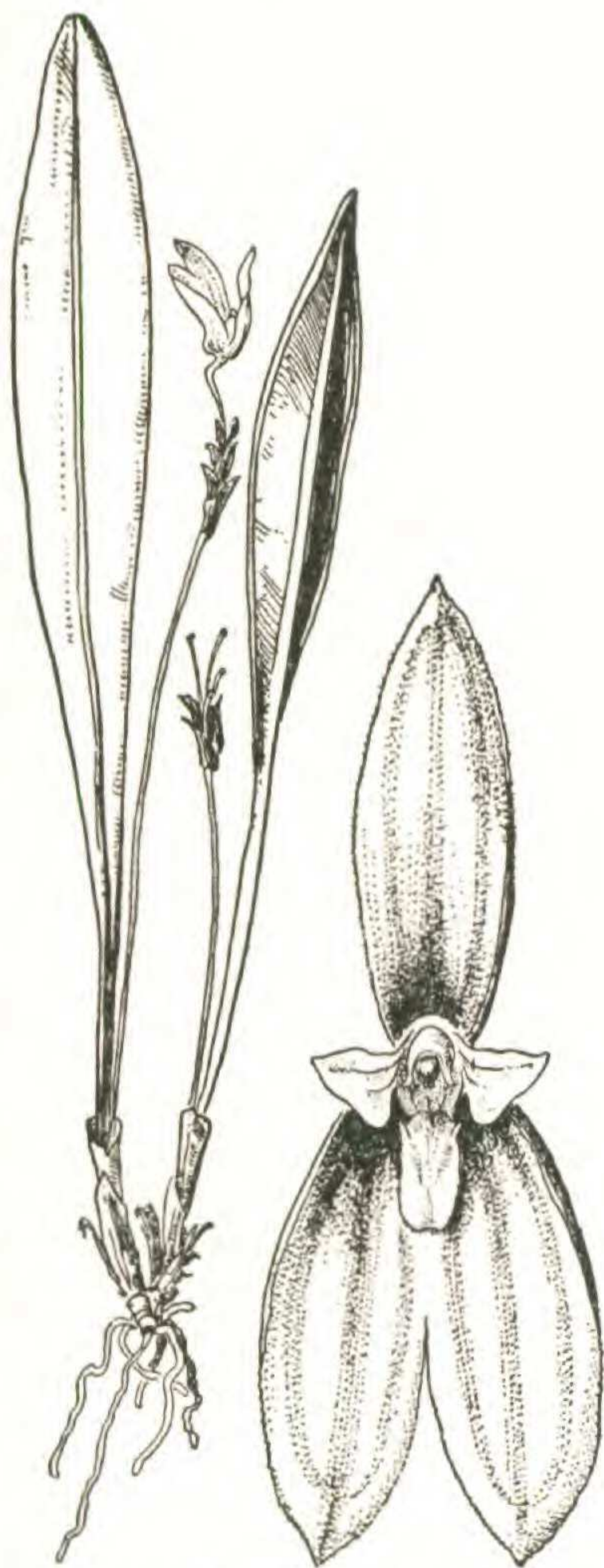


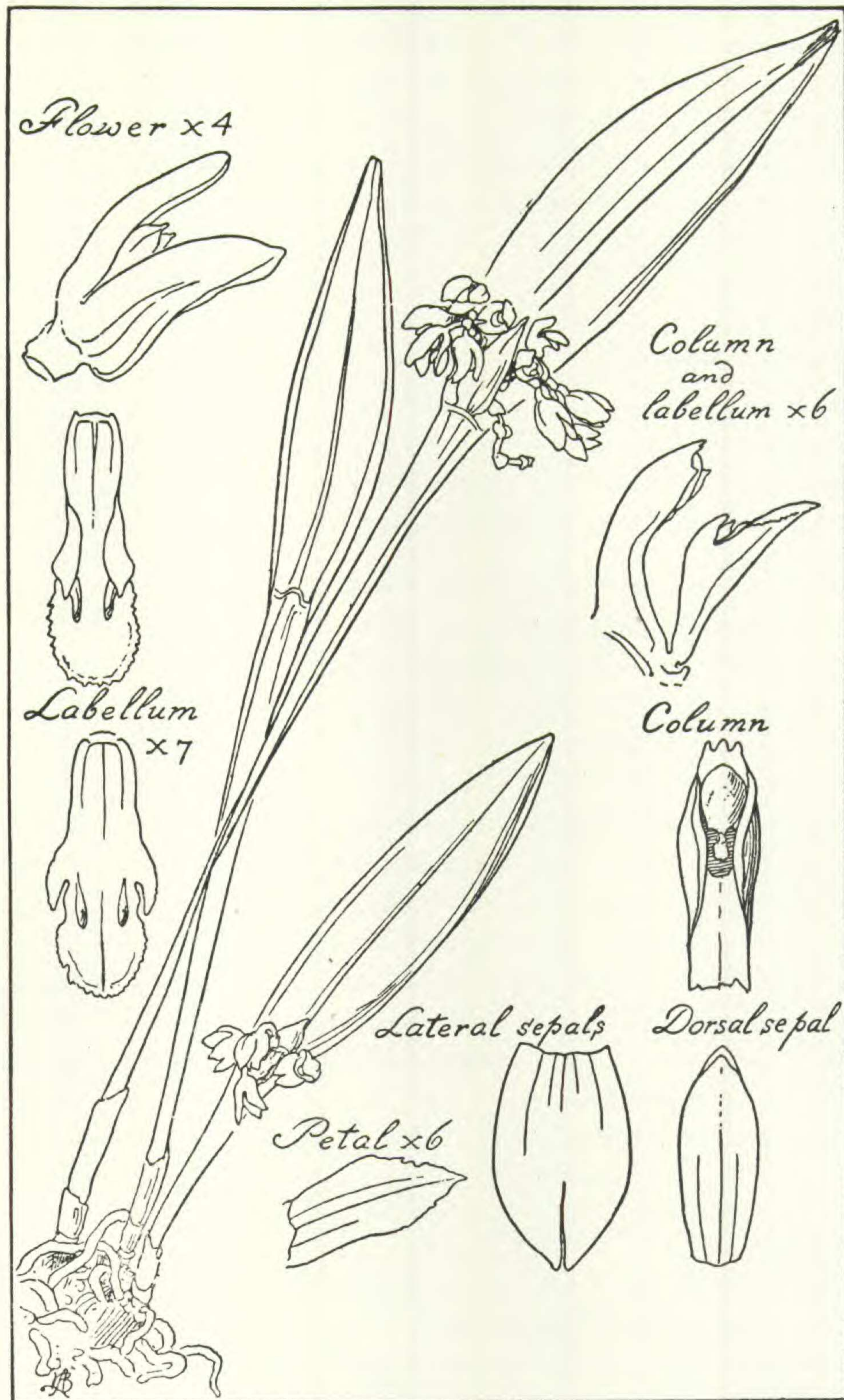
Fig. 105. *Pleurothallis Brighamii*

Small, caespitose, epiphytic herbs up to 12 cm. tall. Secondary stems up to about 6 mm. long, very short and inconspicuous, enclosed by sheaths. Leaves 1.8–9 cm. long and 0.3–1.2 cm. broad, oblanceolate to linear-oblanceolate, obtuse or acute, attenuated to the base, coriaceous. Inflorescence a 1- to several-flowered fascicle borne on a long slender peduncle, up to 12 cm. long, subequal to or exceeding the leaves. Flowers small, opening one at a time. Sepals connate for a short distance at the base; dorsal sepal 6–10 mm. long and 1.2–3 mm. broad, elliptic to oblong-lanceolate, obtuse to acuminate. Lateral sepals 6–9 mm. long and together 3–4.5 mm. broad, oblong to oblong-ovate, connate to the middle or beyond, acute. Petals 2–3.5 mm. long and 0.75–1.7 mm. broad, obliquely spatulate to obliquely oval, the anterior margin produced, acute or acuminate. Lip 2.1–4 mm. long and 0.8–2 mm. broad, oblong-ligulate to oblong-lanceolate, obtuse, the apex ciliate or denticulate, with an auriculate lateral lobe on either side near the base of the lamina, claw with a prominent callus.

A not uncommon plant at low elevations from Guatemala to Panama.

BOCAS DEL TORO: without locality, *Wedel* 185; Isla Colón, *Wedel* 486. CANAL ZONE: Barro Colorado Island, *Kenoyer* 256, *Shattuck* 205, 567; drowned forest between Tumba Vieja and Salamanca, *Steyermark* & *Allen* 16750; Salamanca Hydrographic Station, *Woodson*, *Allen* & *Seibert* 1585; hills east of or near Panama City, alt. near sea-level, *Powell* 92, 219; Gatún Lake, *Powell* 275. DARIÉN: vicinity of El Real, alt. about 15 m., *Allen* 943. PANAMÁ: Río La Maestra, alt. 0–25 m., *Allen* 54; Río Tecúmen, north of Chepo Road, alt. about 30 m., *Hunter* & *Allen* 225; near Tapía River, Juan Díaz region, *Maxon* & *Harvey* 6699; Casa Ladre, San Juan, hills east of Panama City, *Powell* 274, 275, 420, 3508.



Fig. 106. *Pleurothallis alpina*

*Pleurothallis Brighamii* is a variable species which may eventually prove to be the same as *P. pyrsoles* Reichb. f.

23. *PLEUROTHALLIS FULGENS* Reichb. f. in Gard. Chron. n. s. 4:516. 1875.\*

Small, caespitose, epiphytic herbs up to about 10 cm. tall. Secondary stems up to about 1 mm. long. Leaves 4–8.5 cm. long and 1–1.8 cm. broad, elliptic to broadly oblanceolate, attenuated into a petiole at the base. Inflorescence a single



flower or a few-flowered fascicle borne on a long slender peduncle, about as long as or exceeding the leaves. Dorsal sepal 8–9 mm. long and about 3.5 mm. broad, ovate-lanceolate, acuminate, somewhat cucullate. Lateral sepals 10–12 mm. long, connate nearly to the middle, the bases gibbous; free part of the sepals about 6–7 mm. long and 3 mm. broad, lanceolate, acute or acuminate. Petals about 4 mm. long and 1.5 mm. broad, sublanceolate but oblique, produced anteriorly into an auricle at the middle, acute. Lip about 5 mm. long and 2.5 mm. broad, elliptic, obtuse, with a pair of small, erect, lateral lobes below the middle and a pair of parallel, submarginal, lamellate calluses near the middle.

Costa Rica and Panama.

CHIRIQUÍ: Cerro Horqueta, alt. 1200–1500 m., *Powell* 335, 340.

The description is based on a record of the type and the specimen cited. Specimens from Costa Rica which have been referred here are very much larger, have relatively short inflorescences, and show slight floral differences.

24. *PLEUROTHALLIS GLANDULOSA* Ames, Sched. Orch. 6:60. 1923.

*Pleurothallis vittariifolia* Schltr. in Fedde Rep. Sp. Nov. Beih. 19:26. 1923.

Small, caespitose, epiphytic herbs up to about 5 cm. tall. Secondary stems 1 mm. long or less. Leaves 1.5–2.5 cm. long and 0.1–0.2 cm. broad, obtuse, attenuated to the base. Inflorescence a single flower or a few-flowered fascicle; peduncle slender, puberulent, up to about 4 cm. long, exceeding the leaves. Pedicel and ovary up to about 1 cm. long, puberulent. Dorsal sepal 6–9 mm. long and about 1.5 mm. broad, linear-lanceolate, acute or acuminate, puberulent and lightly keeled dorsally. Lateral sepals 6–8 mm. long and together about 2.5 mm. broad, connate to about the middle, gibbous at the base, puberulent and lightly keeled dorsally. Petals about 3 mm. long and 1.3 mm. broad, subdolabriform, cuneate at the base, oblique, apiculate. Lip about 3.5 mm. long and 1 mm. broad, unguiculate; lamina subpandurate and auriculate at the base, glandular-puberulent on the margin and upper surface.

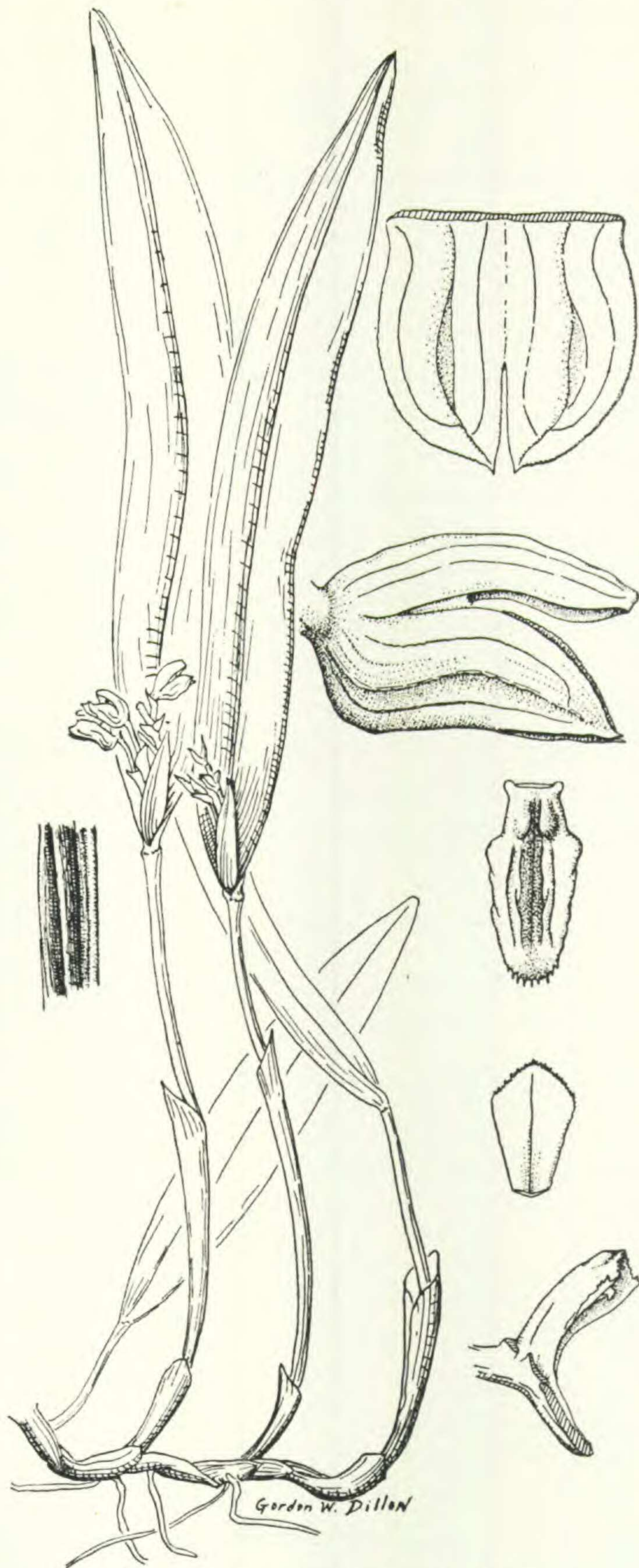
Costa Rica and Panama.

CANAL ZONE: near Vigía and San Juan, *Dodge, Steyermark & Allen* 16578. PROVINCE NOT KNOWN (PANAMÁ or CANAL ZONE?): Juna Grande Range, alt. near sea-level, *Powell* 306, 3430; without data, *Purdom*.

25. *PLEUROTHALLIS ALPINA* Ames, Sched. Orch. 5:14, fig. 3. 1923.

Caespitose epiphytic herbs up to about 4 dm. tall. Secondary stems slender, up to about 3 dm. long, prominently 2- or 3-alate, expanded at the apex and the wings passing into the leaves. Inflorescence a raceme or fascicle of racemes, few-flowered, short, not half as long as the leaf. Leaves 5–12 cm. long and 0.6–2.5 cm. broad, ligulate to elliptic-lanceolate or elliptic-ob lanceolate, acute or obtuse, coriaceous. Sepals acute, fleshy, obscurely puberulent dorsally; dorsal sepal 6–6.5 mm. long and 1.5–2.5 mm. broad, elliptic to oblong-ob lanceolate, cucullate; lateral sepals 5–6 mm. long and 1.5–2 mm. broad, lanceolate, arcuate. Petals about 2.5 mm. long and 1–1.2 mm. broad, elliptic-oblong, acute, serrulate, arcuate. Lip 2.5–4.5 mm. long and 1.5–2 mm. broad, elliptic-oblong, obtuse, with two



Fig. 107. *Pleurothallis pterocaulis*

small lanceolate-arcuate lateral lobes about 0.5 mm. long near the middle, apex fimbriate, with two carinate, longitudinal calluses near the middle of the disc.



Costa Rica and Panama.

CHIRIQUÍ: Caramillia, alt. 1360 m., *Powell 282*. COCLÉ: vicinity of El Valle, alt. 600–1000 m., *Allen 1238*; hills north of El Valle de Antón, alt. about 800–1000 m., *Allen 2289*.

A not uncommon species which is allied to *P. sicaria* Lindl.

26. PLEUROTHALLIS PTEROCAULIS L. Wms. in Ann. Missouri Bot. Gard. 27:280, t. 32, figs. 1-7. 1940.

Repent epiphytic herbs up to about 16.5 cm. tall. Secondary stems 2.5–7 cm. long, winged or strongly angled (at least when dry), shorter than the leaves. Leaves 4–11 cm. long and 1–1.5 cm. broad, elliptic to elliptic-lanceolate, acute, coriaceous. Inflorescence a fascicle of one- to few-flowered racemes, shorter than the leaves. Dorsal sepal about 6 mm. long and 2–2.5 mm. broad, oblong-lanceolate, strongly cucullate, carinate with the apex thickest. Lateral sepals connate for about half or more their length, 5–6 mm. long and together about 5 mm. broad, each sepal oblong-lanceolate, somewhat oblique, acute, carinate and with a thicker carinate cushion near the outer margins. Petals about 2.5 mm. long and 1.7 mm. broad, subrhombic-obovate, the apical margin serrulate. Lip about 4 mm. long and 1.5 mm. broad, unguiculate, oblong-lanceolate, obtuse, carinate, with two inconspicuous calluses at the junction of the lamina and the claw, the claw inconspicuously biauriculate at the base.

Endemic in Panama.

COCLÉ: vicinity of El Valle de Antón, alt. 600–1000 m., *Allen 1239*.

Originally said to be closely allied to *P. hondurensis* Ames, it is probably more closely allied to *P. verecunda* Schltr.

27. PLEUROTHALLIS VERECUNDA Schltr. in Fedde Rep. Sp. Nov. Beih. 17:24. 1922.

Erect, repent, epiphytic herbs up to about 3.5 dm. tall. Secondary stems up to about 19 cm. long, terete or angled (at least when dry). Leaves 8.5–16 cm. long and 1–2.2 cm. broad, elliptic or lanceolate-ligulate, acute, coriaceous. Inflorescence a few-flowered raceme about half as long as the leaves. Dorsal sepal 5.5–7 mm. long and 1.5–2 mm. broad, lanceolate to oblong-lanceolate, acute. Lateral sepals 5.5–7 mm. long and each 1.5–2.5 mm. broad, lanceolate, acute, apex thickened, free nearly to the base. Petals 2.2–3.2 mm. long and 0.75–1 mm. broad, oblong-ob lanceolate, oblique, apical half denticulate. Lip 3–3.5 mm. long and 1.5–2 mm. broad, oblong to oblong-ovate, obtuse, truncate at the shortly unguiculate base; lamina with two short auricles at the base, fleshy, with a submammillate callus at the apex of claw and two lateral callus thickenings.

Costa Rica and Panama.

CANAL ZONE: Río Indio, near mouth of Chagres River, alt. about sea-level, *Powell 91*; Barro Colorado Island, *Shattuck 722*.



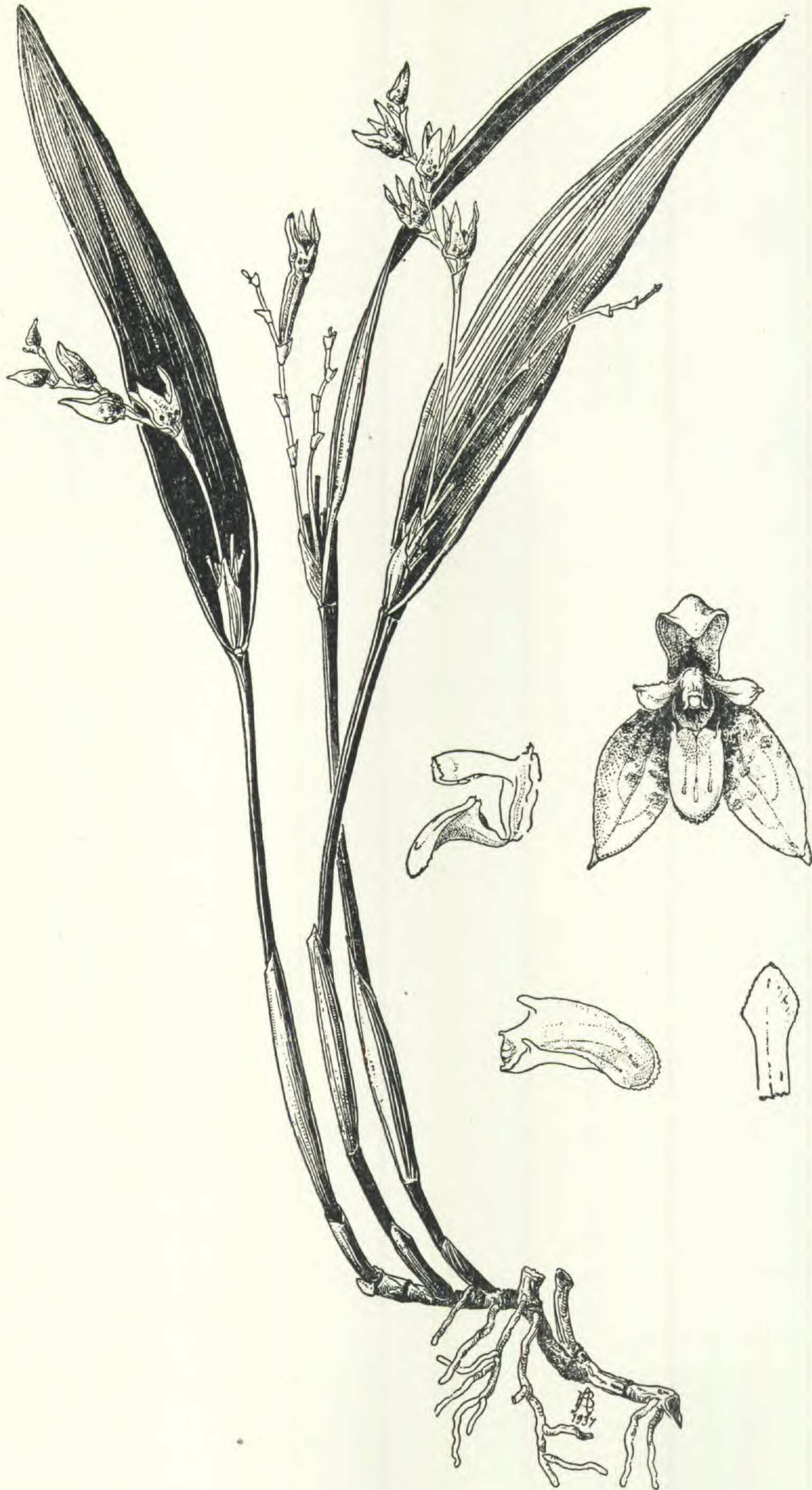


Fig. 108. *Pleurothallis verecunda*

(215)



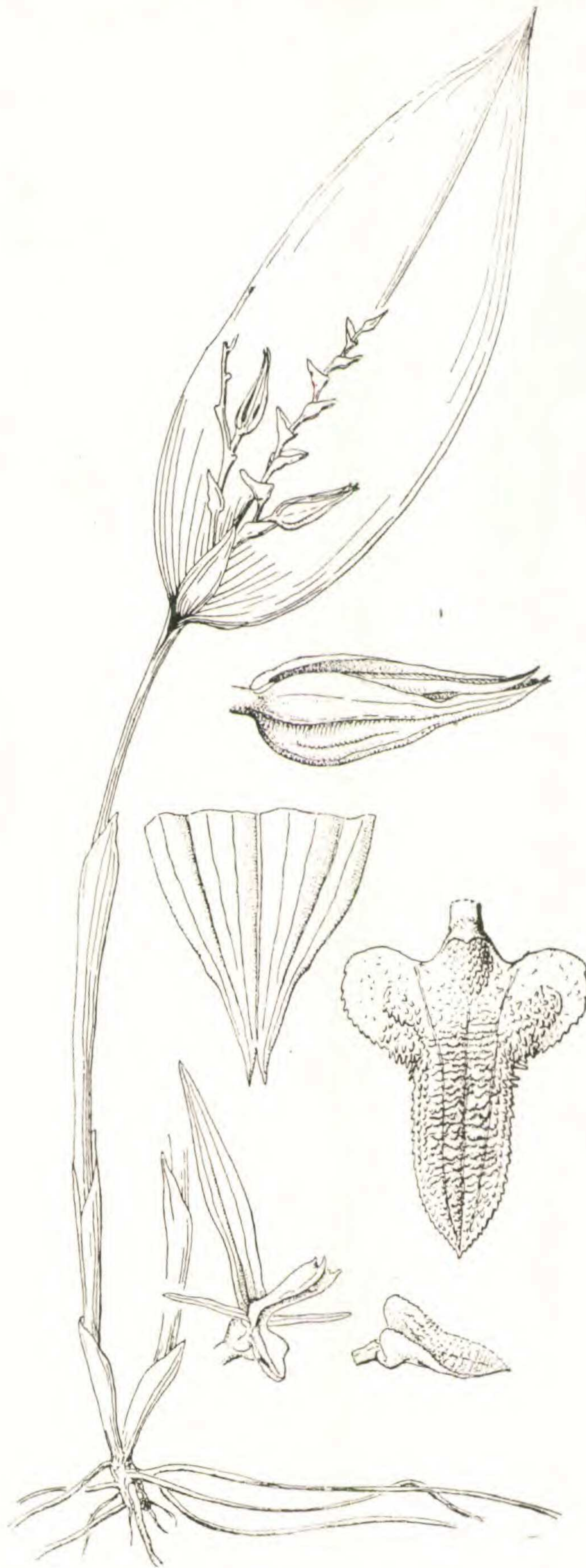


Fig. 109. *Pleurothallis lepidota*



28. *PLEUROTHALLIS LEPIDOTA* L. Wms. in Ann. Missouri Bot. Gard. 27:279, *pl.* 32, *figs.* 8-12. 1940.

Small, caespitose, epiphytic herbs up to about 2.2 dm. tall. Secondary stems about 9–12 cm. long, partially invested with 2–3 scarious sheaths. Leaves 7–10 cm. long and 3–3.5 cm. broad, elliptic to elliptic-lanceolate, short-acuminate. Inflorescence one or more few-flowered racemes, shorter than the leaves. Dorsal sepal 13–14 mm. long and about 2 mm. broad, linear-lanceolate, acute. Lateral sepals about 14 mm. long and together 12 mm. broad at their bases, subtriangular, connate nearly to their apices, acuminate or acute, carinate-winged along the mid-nerve dorsally, outer surface papilliferous. Petals about 5 mm. long and 0.25 mm. broad, linear, acute. Lip about 8 mm. long and 5 mm. broad, unguiculate, obscurely 3-lobed, upper surface lepidote-verrucose, with a mammillate callus at the junction of the lamina and the claw, margins serrulate to serrate; lateral lobes 2 mm. long and as broad, rounded; mid-lobe oblong-lanceolate, acute, about 4–5 mm. long and 2 mm. broad.

Panama.

CHIRIQUÍ: Llanos del Volcán, alt. about 1300 m., *Allen 1552*.

29. *PLEUROTHALLIS COGNIAUXIANA* Schltr. in Fedde Rep. Sp. Nov. 3:246. 1907.

Repent or caespitose epiphytic herbs up to about 3.2 dm. tall. Secondary stems up to about 19 cm. long, slender, naked or with 1–2 sheaths at the base, with 2–3 narrow but prominent wings. Leaves 8–15 cm. long and 3–9 cm. broad, elliptic-lanceolate to ovate-lanceolate. Inflorescence 1 or more short racemes up to half as long as the leaves. Dorsal sepal 9–11 mm. long and 3–4.5 mm. broad, elliptic-obovate, obtuse or acute, slightly verrucose within. Lateral sepals 5–7.5 mm. long and together 5–7 mm. broad, suborbicular, connate to their apices or nearly so, slightly verrucose within. Petals 3.5–4.5 mm. long and 1.5–2.4 mm. broad, lanceolate-subrhombic, acute, terminal half denticulate. Lip 4–5 mm. long and 2–3 mm. broad, subrhombic, unguiculate, with two inflexed auricles or lateral lobes below the middle and two auricles at the base of the claw, surface of the apical half verrucose and the margin denticulate, with 2 parallel callus thickenings near the middle.

Costa Rica and Panama.

CHIRIQUÍ: vicinity of "New Switzerland," alt. 1800–2000 m., *Allen 1383*; Bajo Chorro, alt. 1800 m., *Davidson 109*, 382.

30. *PLEUROTHALLIS VITTATA* Lindl. in Bot. Reg. 24: Misc. p. 73. 1838; L. Wms. in Ann. Missouri Bot. Gard. 26:280. 1939.

*Pleurothallis polystachya* Rich. & Gal. in Ann. Sci. Nat. III, 3:16. 1845.

*Pleurothallis mandibularis* Kränzl. in Vid. Medd. Naturh. Foren. 71:169. 1920.

*Pleurothallis Bourgeau* Kränzl. in Ark. f. Bot. 16<sup>8</sup>:15. 1920.

Repent or caespitose epiphytic herbs up to about 2.5 dm. tall. Secondary stems up to 15 cm. long, prominently angled, at least when dry. Leaves 5–12 cm. long and 1–2.3 cm. broad, lanceolate to elliptic-ligulate, acute or obtuse,



coriaceous. Inflorescence 1-several short racemes,  $\frac{2}{3}$  as long as the leaves or less. Sepals densely puberulent dorsally; dorsal sepal 5-8 mm. long and 1.5-2 mm. broad, oblanceolate, acute; lateral sepals 5-8 mm. long and together 3-5 mm. broad, ovate or oblong-ovate, connate to their apices, slightly gibbous at the base. Petals 2.2-2.7 mm. long and 1.2-1.5 mm. broad, obovate, acute or obtuse, serrulate above. Lip 2-3 mm. long and 1.2-1.5 mm. broad, oval, obtuse, denticulate above, unguiculate, with 2 small inflexed, crescent-shaped lateral lobes near the middle of the lip and 2 auricles at the base of the claw; lamina with 2 parallel callus-like thickenings near the middle.

Mexico, Guatemala, Honduras, Costa Rica, Panama, and possibly Venezuela.

COCLÉ: hills south of El Valle de Antón, alt. 700 m., *Allen 2513*; between Las Margaritas and El Valle, *Woodson, Allen & Seibert 1282*.

31. PLEUROTHALLIS VELATICAULIS Reichb. f. in *Linnaea* 22:824. 1849.

*Pleurothallis Pittieri* Schltr. in *Fedde Rep. Sp. Nov.* 3:247. 1907.

Small to large, caespitose, epiphytic herbs up to about 6 dm. tall. Secondary stems up to 4 dm. long, slender to stout, partly to entirely covered with loose sheaths. Leaves extremely variable, 8-22 cm. long and 1.2-9 cm. broad, oblanceolate-ligulate to oval, attenuated into a petiole at the base. Inflorescence a raceme or fascicle of racemes, shorter than the leaf. Dorsal sepal 3-5.5 mm. long and 1.2-1.8 mm. broad, lanceolate or lanceolate-oblong, acute, somewhat cucullate. Lateral sepals 3.5-5 mm. long and 1-1.8 mm. broad, lanceolate, acute, lightly connate nearly to the apices but becoming free. Petals 1.5-3 mm. long and 0.5-0.75 mm. broad, oblong to oblong-oblanceolate, obtuse. Lip 1-2 mm. long and 1-1.5 mm. broad, oblong-oval to subrhombic, obtuse, with fleshy, erect, auriculate lateral lobes near the middle.

Costa Rica, Panama, the West Indies, and from Venezuela to Peru.

CHIRIQUÍ: forests between Las Palmas and top of Cerro de la Horqueta, alt. 2100-2268 m., *Pittier 3227*. COCLÉ: hills north of El Valle de Antón, alt. 1000 m., *Allen 2245*.

One of the most variable of the species of *Pleurothallis* in Panama.

32. PLEUROTHALLIS GELIDA Lindl. in *Bot. Reg.* 27: Misc. p. 91. 1841.

*Pleurothallis chiriquensis* Schltr. in *Fedde Rep. Sp. Nov. Beih.* 17:19. 1922.

Caespitose epiphytic herbs up to about 5.5 dm. tall. Secondary stems up to about 3.5 dm. long and about 0.4 cm. in diameter toward the base, partially covered with chartaceous sheaths. Leaves 8-23 cm. long and 1.5-7 cm. broad, elliptic-oblong to oblong-ovate, obtuse or acute, coriaceous, attenuated into a short petiole at the base. Inflorescence 1-several racemes, either shorter, subequal to, or longer than the subtending leaf, few- to many-flowered. Dorsal sepal 5-7.5 mm. long and 2-2.5 mm. broad, oblong-lanceolate, acute, cucullate, puberulent within. Lateral sepals 5-6 mm. long and each 2-2.5 mm. broad, acute, connate to the middle or nearly so, puberulent within. Petals 2.5-3.5 mm. long and 1.5-2.5 mm. broad, oblong-obovate to subrhombic, obtuse or truncate and the apex often dentate or lobulate. Lip 2-2.5 mm. long and 0.9-1.4 mm. broad, dilated from a





Fig. 110. *Pleurothallis gelida*

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narrow base into an oblong-cuneate lamina, truncate, with 2 parallel, lamellate calluses near the middle.

Florida, Mexico to Panama, the West Indies, South America.

BOCAS DEL TORO: "Chiriquí," alt. 1200-1500 m., *Powell 227*.

A variable species and one of the most widespread of the genus.



Fig. 111. *Pleurothallis Rowleyi*



33. *PLEUROTHALLIS ROWLEEI* Ames, Sched. Orch. 1:11. 1922; loc. cit. 7: *t.* 18. 1924.

*Pleurothallis cucullata* Ames, loc. cit. 3:5. 1923; loc. cit. 7: *t.* 17. 1924.

Caespitose or repent epiphytic herbs up to 3.5 dm. tall. Secondary stems up to 25 cm. long, slender, partially covered with one or two sheaths. Leaves 3-13

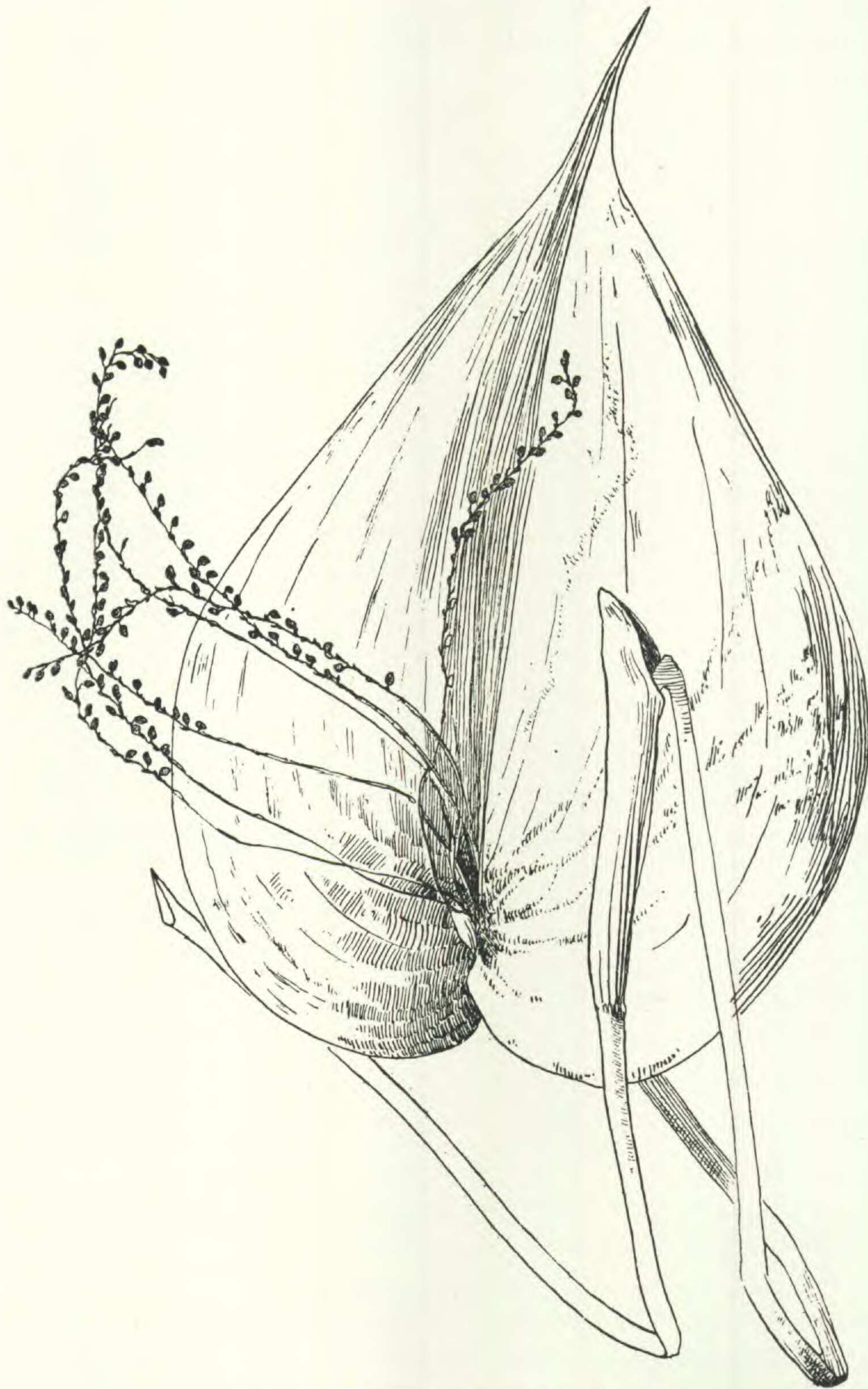


Fig. 112. *Pleurothallis praegrans*



cm. long and 1–5.4 cm. broad, elliptic-lanceolate to ovate-lanceolate, acuminate, subcordate at the base. Inflorescence 1 to few slender racemes, shorter or rarely longer than the subtending leaf. Dorsal sepal 6–11 mm. long and 2.5–5.5 mm. broad, lanceolate to ovate-lanceolate, acute or acuminate, cucullate. Lateral sepals 7–10 mm. long and together 2.2–7 mm. broad, elliptic-oval to ovate, acute or obtuse, connate to the apices. Petals 6–8.5 mm. long and 1.2–2.5 mm. broad, subsigmoid-elliptic, denticulate, acute. Lip 2.5–4 mm. long and 1.5–2.5 mm. broad, subsagittate; the basal portion broad and fleshy; the apical portion narrowly triangular.

Costa Rica and Panama.

CHIRIQUÍ: Bajo Chorro, alt. 1810 m., *Davidson*. DARIÉN: Cana-Cuasi trail, alt. 1650 m., *Terry & Terry 156*.

34. PLEUROTHALLIS PRAEGRANDIS Ames, Sched. Orch. 5:17. 1923; loc. cit. 7: *t. 17*. 1924.

Large, caespitose, epiphytic herbs up to about 12 dm. tall. Secondary stems up to about 9 dm. long. Leaf 31.5 cm. long and 20.5 cm. broad, cordate, acuminate. Inflorescence consisting of several racemes which are shorter than the leaf. Dorsal sepal 2.5–3 mm. long and about 1–1.5 mm. broad, elliptic-oblong, acute. Lateral sepals about 3.5 mm. long, connate to their apices, suborbicular, cochleate. Petals about 2 mm. long and about 1 mm. broad, oblong-spatulate, obtuse, the apex fleshy-thickened. Lip about 1 mm. long and 2.5–3 mm. broad, transversely elliptic; disc with a transversely rhombic thickening in the middle.

Panama.

DARIÉN: Cana and vicinity, alt. about 1800 m., *Williams 973*.

Description based on a photograph and a flower of the type, and the original description.

35. PLEUROTHALLIS ELLIPSOPHYLLA L. Wms. in Ann. Missouri Bot. Gard. 29:344. 1942.

Small, repent or caespitose, epiphytic herbs up to about 2 dm. tall. Secondary stems up to 9.5 cm. long, prominently angled when dry, with one or more loose sheaths covering the basal part. Leaves 4–9.5 cm. long and 0.7–2.7 cm. broad, elliptic to elliptic-oblong, acute or obtuse, coriaceous. Inflorescence of 1 to several short, few-flowered racemes, about half as long as the leaves. Dorsal sepal 9–14 mm. long and 1.5–2.5 mm. broad, narrowly lanceolate to elliptic-oblong, acute or acuminate, cucullate, puberulent dorsally. Lateral sepals 10–13 mm. long and together 3–4 mm. broad, connate except at the very tip, the lamina lanceolate, acute or acuminate, pubescent dorsally, gibbous and with a mentum at the base. Petals 5.5–6.5 mm. long and 1.4–2 mm. broad, elliptic or elliptic-lanceolate, acute or acuminate, arcuate, denticulate or denticulate-lacerate toward the middle but the base and apex usually entire. Lip 4–5 mm. long and 1–1.3 mm. broad, lanceolate, acute or subaristate, biauriculate at the base, claw





Fig. 113. *Pleurothallis ellipsophylla*

short; lamina with an inconspicuous V-shaped callus on the basal  $\frac{1}{3}$ .

Panama.

BOCAS DEL TORO: Maccaw Hill, Isla Colón, alt. 0–125 m., *von Wedel 560*; Río Cricamola, between St. Louis and Konkintöe, alt. about 10–15 m., *Woodson, Allen & Seibert 1884*.

36. *PLEUROTHALLIS STENOSTACHYA* Reichb. f. in *Linnaea* 18:399. 1844.

*Pleurothallis myriantha* Lehm. & Kränzl. in *Engl. Bot. Jahrb.* 26:445. 1899.

*Pleurothallis Lankesteri* Rolfe in *Kew. Bull.* 1914: 210. 1914.

*Pleurothallis dubia* Rich. & Gal. var. *myriantha* Schltr. in *Fedde Rep. Sp. Nov. Beih.* 17:20. 1922.

*Pleurothallis stenostachya* Reichb. f. var. *Lankesteri* Ames, *Sched. Orch.* 7:31, t. 15 pars. 1924.

Small, caespitose, epiphytic herbs up to about 1 dm. tall. Secondary stems up to about 2 cm. long, very slender, covered with loose sheaths. Leaves long-petiolate; lamina 0.5–5 cm. long and 0.3–0.9 cm. broad, linear-elliptic to oblong-elliptic or usually oblanceolate, attenuated into the petiole; petiole very slender, 0.3–3 cm. long. Inflorescence a fascicle of short, few-flowered racemes; the flowers from greenish to brick-red and very small. Dorsal sepal 1.2–1.7 mm.



long, lanceolate-ovate to ovate, strongly cucullate, acute. Lateral sepals 1.2–1.5 mm. long and 0.5–0.75 mm. broad, segments lanceolate-ovate, acuminate, connate below the middle. Petals 1–1.5 mm. long and 0.2–0.6 mm. broad, linear-lanceolate, acute, arcuate. Lip 1.1–1.3 mm. long and 0.5–0.7 mm. broad, elliptic-oval, obtuse, glandular-puberulent above, short-unguiculate.

Mexico, British Honduras, Guatemala, Honduras, Costa Rica, and Panama.

CHIRIQUÍ: Boquete, alt. 1500 m., *Davidson 1268*; El Boquete, alt. 1000–1300 m., *Pittier 2989*; "Chiriquí," alt. 1060 m., *Powell 224*; vicinity of Boquete, alt. 1200–1500 m., *Woodson & Schery 800*.

A small-flowered and distinctive species.

37. *PLEUROTHALLIS OVATILABIA* Ames & Schweinf. Sched. Orch. 10:33. 1930.

Small, caespitose, epiphytic herbs up to about 8 cm. tall. Secondary stems up to about 6 mm. long, covered with scarious sheaths. Leaves 2.5–6 cm. long and 0.25–0.6 cm. broad, narrowly oblanceolate, obtuse, attenuated into a long petiole at the base. Inflorescence surpassing the leaves or rarely subequal; raceme slender, unilateral, up to about 3 cm. long. Sepals 1.5–1.8 mm. long and 0.9–1 mm. broad, subovate or oblong-ovate, acute or obtuse, cucullate. Petals 1.4–1.5 mm. long and 0.3–0.4 mm. broad, linear-lanceolate, acute, falcate. Lip 1.5–2.5 mm. long and about 1 mm. broad, ovate, acute.

Honduras, Costa Rica, and Panama.

CHIRIQUÍ: El Boquete, alt. 1000 m., *Pittier 2990*.

Possibly only a variety of *P. lancilabris* (Reichb. f.) Schltr.

38. *PLEUROTHALLIS GROBYI* Batem. ex Lindl. in Bot. Reg. 21: *t. 1797*. 1835; Hook. in Bot. Mag. 65: *t. 3682*. 1838; L. Wms. ex A. C. Sm. in *Lloydia* 2:172. 1939.

*Pleurothallis picta* Lindl. in Bot. Reg. 21: sub *t. 1797*. 1835; Lindl. loc. cit. 21: *t. 1825*. 1836.

*Pleurothallis marginata* Lindl. loc. cit. 24: Misc. p. 42. 1838.

*Pleurothallis panamensis* Schltr. in Fedde Rep. Sp. Nov. 17:140. 1921.

*Pleurothallis dryadum* Schltr. in Fedde Rep. Sp. Nov. Beih. 19:186. 1923, non Schltr. 1922.

*Pleurothallis integrilabia* Ames, Hub. & Schweinf. in Bot. Mus. Leafl. Harv. Univ. 3:39. 1934.

Small, densely caespitose, epiphytic herbs up to about 15 cm. tall. Leaves 1.5–7 cm. long and 0.15–0.8 cm. broad, ob-



Fig. 114. *Pleurothallis Grobyi*



lanceolate to ovate-lanceolate to suborbicular, obtuse or acute, often marginate, attenuated into a petiole at the base. Inflorescence a few- to several-flowered raceme, usually much exceeding the leaf. Dorsal sepal 3.2–9 mm. long and 1.2–3 mm. broad, lanceolate to elliptic-ovate, acute or acuminate, cucullate. Lateral sepals 3–11 mm. long and together 1.2–3 mm. broad, lanceolate to oblong-lanceolate to ovate-lanceolate, acute or acuminate, gibbous at the base, connate to the apex or nearly so. Petals 1.5–2.5 mm. long and 0.4–0.8 mm. broad, ovate-oblongate or nearly so, acute or obtuse, more or less oblique. Lip 2–3 mm. long and 0.6–1.3 mm. broad, oblong, obtuse, short-unguiculate.

Mexico to Panama, the West Indies and in South America.

CANAL ZONE: Quebrada Lopez, *Allen 2137*; Barro Colorado Island, *Aviles 55*; *Shattuck 226, 546*; *Standley 31499, 41176*; near Vigia and San Juan, alt. 66 m., *Dodge, Steyermark & Allen 16526*; around Gamboa, alt. 2–100 m., *Pittier 4787*; hills north of Frijoles, *Standley 27665*; Salamanca Hydrographic Station, alt. about 80 m., *Woodson, Allen & Seibert 1560, 1580*. CHIRIQUÍ and VERAGUAS: auf Pampasbäumen, *Wagner 24*. COLÓN: Río Indio, alt. near sea-level, *Pittier 4264*. PANAMÁ: Río La Maestra, alt. 0–25 m., *Allen 53*; hills east of Panama City, *Powell 106*.

*Pleurothallis Grobyi* is quite a variable and widespread species. It is found mostly near sea-level, rarely as high as 900 meters.

39. *PLEUROTHALLIS CALYPTROSTELE* Schltr. in Fedde Rep. Sp. Nov. Beih. 19:23. 1923; L. Wms. in Ann. Missouri Bot. Gard. 27:276, t. 33, figs. 11-15. 1940.

*Pleurothallis biflora* Schltr. loc. cit. 181, non Focke.

*Pleurothallis geminiflora* Ames, Hub. & Schweinf. in Bot. Mus. Leafl. Harv. Univ. 3:39. 1934.

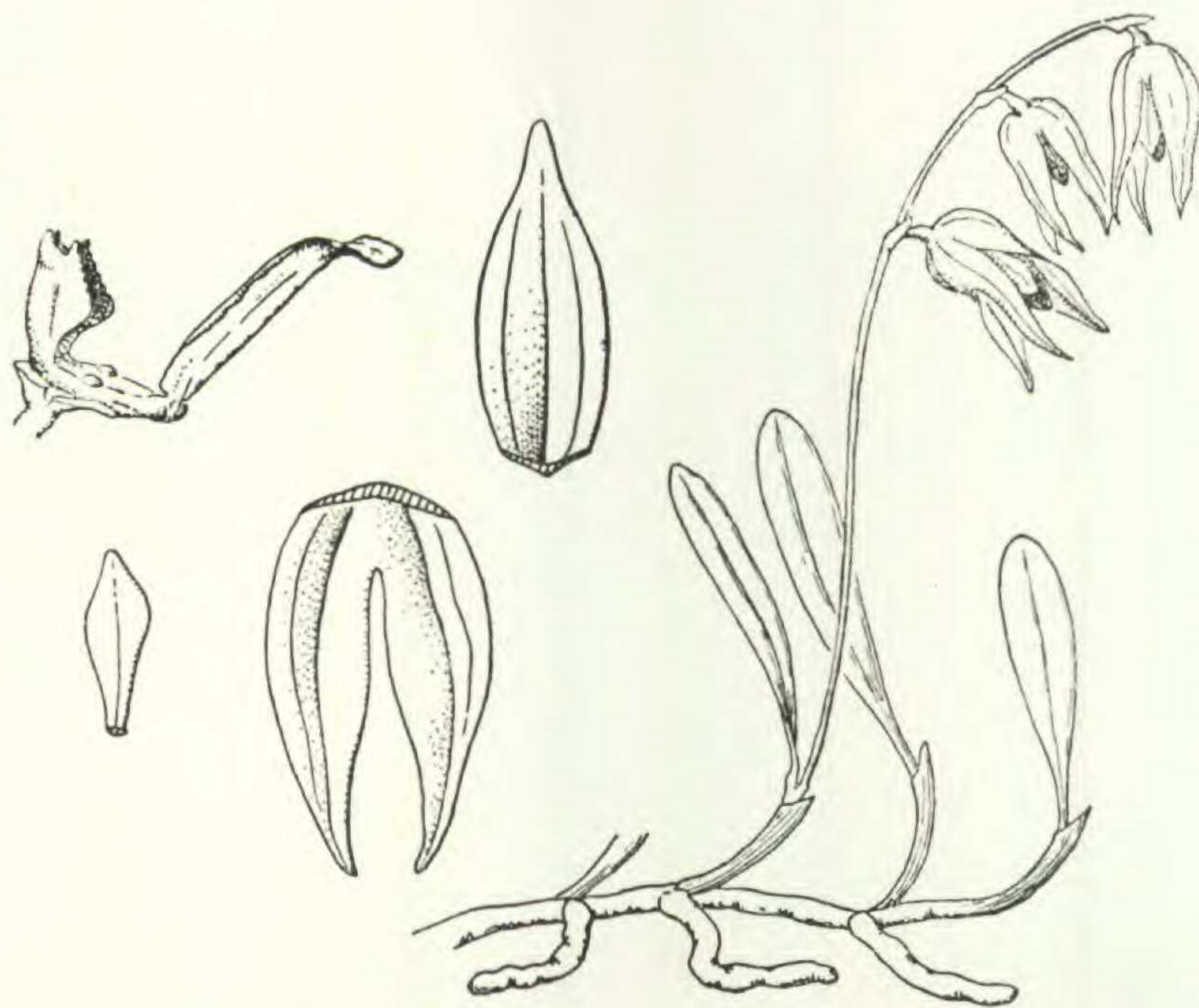


Fig. 115. *Pleurothallis calyptrastele*

Small, repent or caespitose, epiphytic herbs up to about 3 cm. tall. Secondary stems about 2–3 mm. long, covered with scarious sheaths. Leaves 5–15 mm. long



and 1–4 mm. broad, oblanceolate, obtuse, attenuated into a petiole at the base. Inflorescence a few-flowered raceme, longer than the leaves. Dorsal sepal 4–5.5 mm. long and 1.2–1.5 mm. broad, oblong-lanceolate, acuminate. Lateral sepals 3.5–6 mm. long and 1–1.6 mm. broad, lanceolate, acuminate, arcuate, free nearly to the bases. Petals 1.8–2 mm. long and 0.5–0.6 mm. broad, oblanceolate, acute, slightly oblique. Lip 2–2.5 mm. long and 0.5–1 mm. broad, narrowly oblong, obtuse.

Costa Rica and Panama.

COCLÉ: vicinity of El Valle, alt. 600–1000 m., *Allen 1233*.

40. *PLEUROTHALLIS FUEGII* var. *echinata* L. Wms., var. nov.<sup>1</sup>

Small, caespitose, epiphytic herbs up to about 4 cm. tall. Secondary stems very short, up to about 3 mm. long, covered with loose sheaths. Leaves 10–17 mm. long and 3–6 mm. broad, oval to oblong-obovate, obtuse, attenuated into a slender petiole at the base. Inflorescence exceeding the leaves, a simple few-flowered raceme. Dorsal sepal 8–9 mm. long and 1.5–2 mm. broad, lanceolate, long-acuminate. Lateral sepals connate to about the middle, about 7–9 mm. long and together about 3 mm. broad, the segments lanceolate, long-acuminate. Petals 2.5–3 mm. long and 0.6–1 mm. broad, oblong-lanceolate, obtuse. Lip about 3.5 mm. long and about 1.5 mm. broad, short-unguiculate, oblong-ovate, obtuse, constricted toward the middle. Ovary echinate.

Endemic in Panama.

CHIRIQUÍ: Volcán de Chiriquí, alt. about 2720 m., *Davidson 981* (TYPE in Herb. Ames).

The variety *echinata* differs from the species in having an echinate ovary, narrower petals, larger flowers, and larger leaves. The material is not as good as might be desired, and more adequate material may show it to be a distinct species.

41. *PLEUROTHALLIS ARISTATA* Hook. in *Ann. & Mag. Nat. Hist.* 2:329, *t.* 15. 1839.

*Pleurothallis dichotoma* Ames, *Sched. Orch.* 6:58. 1923, non Schltr.

*Pleurothallis divexa* Ames, loc. cit. 7:20, *t.* 5. 1924.

Small, caespitose, epiphytic herbs up to about 7 cm. tall. Secondary stems very short, 1–3 mm. long. Leaves 8–24 mm. long and 1.5–4.5 mm. broad, oblong to oblanceolate, obtuse, attenuated into a petiole at the base. Inflorescence much exceeding the leaves, a fractiflex raceme with relatively few flowers. Dorsal sepal 4.5–9 mm. long and 1–1.8 mm. broad, lanceolate to ovate-lanceolate, aristate-acuminate, cucullate. Lateral sepals 4.5–9 mm. long and 1–1.6 mm. broad, lanceolate, aristate-acuminate, connate about 1 mm. at the base. Petals about 2–3 mm. long and 1–1.5 mm. broad, lanceolate-ovate to ovate, acute or acuminate, fimbriate or lacerate-fimbriate. Lip 2–3 mm. long and 0.6–1.5 mm. broad, ob-

<sup>1</sup>Herbae parvae caespitosae epiphyticae usque ad 4 cm. altae. Folia ovalia vel oblongo-ovata, obtusa. Sepalum dorsale lanceolatum, acuminatum. Sepala lateralia usque ad medium connata, lanceolata, acuminata. Petala oblongo-oblanceolata, obtusa. Labellum oblongo-ovatum, obtusum. Ovarium echinatum.



long, obtuse, subauriculate at the base, with 2 erect side lobes, keeled on the mid-nerve below, apical half of lip more or less fleshy and terete, lepidote-verrucose.

Costa Rica, Panama, and the West Indies.

CHIRIQUÍ: Bajo Chorro, alt. 1800 m., *Davidson 187*.

The specimen upon which this record is based is unsatisfactory but perhaps it belongs to this species.

42. *PLEUROTHALIS PRUINOSA* Lindl. in Bot. Reg. 28: Misc. p. 75. 1842.

*Pleurothallis pauciflora* Schltr. in Fedde Rep. Sp. Nov. Beih. 19:192. 1923.

Small, caespitose or repent, epiphytic herbs up to about 14 cm. tall. Secondary stems slender, usually with but one sheath, longer than the leaves. Leaves 1–5 cm. long and 0.4–0.7 cm. broad, linear-elliptic to linear-lanceolate (rarely broader), acute or obtuse, coriaceous. Inflorescence a slender, few-flowered raceme, subequal to or exceeding the leaves (rarely shorter). Dorsal sepal 2.5–4 mm. long and 1.5–1.8 mm. broad, lanceolate to ovate-lanceolate, acute or acuminate, cucullate. Lateral sepals 2.5–4 mm. long and together 1.5–2.5 mm. broad, ovate or ovate-lanceolate, cochleate, connate to their apices. Petals 2–3 mm. long and 0.3–0.5 mm. broad, linear or linear-lanceolate, acute. Lip 1.5–2 mm. long and 0.8–1 mm. broad, ovate-lanceolate to triangular-lanceolate, acute or acuminate, fleshy.

Honduras, Costa Rica, Panama, the West Indies, Surinam, French Guiana, and possibly Peru.

CHIRIQUÍ: Boquete, alt. 1150 m., *Davidson 708*; Chiriquí, alt. 1200 m., *Powell 434*.

A variable species. The Central American material is usually smaller than that from the West Indies.

43. *PLEUROTHALLIS MACRANTHA* L. Wms. in Ann. Missouri Bot. Gard. 28:417, pl. 21, figs. 1–6. 1941.

Caespitose, epiphytic or terrestrial herbs up to 23 cm. tall. Secondary stems 6–8 cm. long, subequal to the leaves in length on mature plants, almost completely invested with one or two loose, scarious sheaths, unifoliate. Leaves 4–7 cm. long and 1.5–2.8 cm. broad, elliptic, obtuse, coriaceous. Inflorescence a several-flowered raceme, about twice exceeding the subtending leaves; sheath at the base of the peduncle short, about 9–11 mm. long; bracts 6–7 mm. long, ovate-lanceolate, scarious, semiamplexicaul. Dorsal sepal 16–20 mm. long and 6–8 mm. broad, elliptic to oblanceolate-elliptic, acute, 3-nerved, keeled dorsally along the mid-nerve. Lateral sepals 16–18 mm. long and together 6–8 mm. broad, connate almost to their apices, oblong-oblanceolate, acute, together 4-nerved, somewhat gibbous at the base. Petals about 9–11 mm. long and 5–6 mm. broad near the apex, oblong-obovate, slightly oblique, truncate or slightly retuse, 3-nerved, with an inconspicuous cushion-like callus near the base. Lip 10–12 mm. long and 3–4 mm. broad toward the apex when expanded, about 2 mm. broad near the middle and 3 mm. broad across the auriculate base, subterete, and sulcate above, somewhat



laterally compressed, expanding toward the apex and into two auricles at the base, with three small calluses between the basal auricles.

Endemic in Panama.

CHIRIQUÍ: Bajo Chorro, alt. 1900 m., *Woodson & Schery 666*.

A very large-flowered species of *Pleurothallis*.

44. *PLEUROTHALLIS TUERCKHEIMII* Schltr. in Fedde Rep. Sp. Nov. 10:292. 1912.  
*Pleurothallis megachlamys* Schltr. in Fedde Rep. Sp. Nov. Beih. 19:108. 1923.

Caespitose epiphytic herbs up to about 7.5 dm. tall, but usually about 3 dm. tall. Secondary stems 5.5–42 cm. long, usually provided with 1–2 loose, ancipitous, brown, chartaceous sheaths. Leaves 8–27 cm. long and 2.5–7.5 cm. broad, elliptic to oval, obtuse or rarely acute, attenuated into a short petiole at the base, either longer or shorter than the secondary stem, usually shorter than the inflorescence or occasionally subequal. Inflorescence an erect raceme which usually exceeds the leaves, the flowers among the largest of the genus; sheath up to about 9 cm. long, conspicuous. Dorsal sepal 11–25 mm. long and 4–6 mm. broad, lanceolate, acute or acuminate, cucullate, puberulent dorsally. Lateral sepals connate nearly to their apices, 14–25 mm. long and 6–7 mm. broad, elliptic to oblong-lanceolate, acute, puberulent dorsally. Petals 4.5–8 mm. long and 2.5–4 mm. broad, oblong-oval to oval, arcuate, verrucose and subcochleate toward the apex. Lip 5–9 mm. long and about 3–3.5 mm. broad, auriculate at the base, the auricles erect; lamina ligulate, rostrate, fleshy, smooth or verrucose.

Mexico, Guatemala, Costa Rica, and Panama.

CHIRIQUÍ: upper Río Chiriquí Viejo, alt. 1300–1900 m., *White & White 18*; vicinity of Monte Lirio, alt. 1300–1900 m., *Seibert 142*.

45. *PLEUROTHALLIS POWELLII* Schltr. in Fedde Rep. Sp. Nov. Beih. 17:22. 1923.

Large (for genus), caespitose, epiphytic herbs up to about 7 dm. tall. Secondary stems up to probably 35 cm. long. Leaves 20–25 cm. long and 7–9 cm. broad, oblong-elliptic to ovate-lanceolate, obtuse or acute. Inflorescence several- to many-flowered, exceeding the leaves in length. Sepals all slightly connate at the base, the laterals connate nearly to their apices; dorsal sepal 12–20 mm. long and 2–2.5 mm. broad, ligulate or lanceolate, acute or acuminate; lateral sepals 14–20 mm. long and 6–7 mm. broad, oblong-lanceolate to lanceolate-ovate, cymbiform, acute. Petals about 6 mm. long and 1.6–2.6 mm. broad, oblanceolate to oblong-oblanceolate, obtuse, falcate. Lip about 5 mm. long and 2–2.5 mm. broad, lanceolate-ovate, obtuse, very fleshy, with 2 upright carinate wings above, one on either side and one dorsally.

Costa Rica (?), and Panama.

CHIRIQUÍ: "Chiriquí," alt. 1100–1200 m., *Powell 146, 3365*.

One of the largest species of *Pleurothallis* in Panama. Known only from one collection, with field number and garden number—a numbering often practiced by Mr. Powell, whose field numbers were rarely used on specimens and then always in conjunction with the garden numbers.



46. *PLEUROTHALLIS SEGOVIENSIS* Reichb. f. in *Bonplandia* 3:223. 1855; C. Schweinf. in *Bot. Mus. Leafl. Harv. Univ.* 4:96. 1937.

*Pleurothallis Wagneri* Schltr. in *Fedde Rep. Sp. Nov.* 17:141. 1921.

*Pleurothallis falcatiloba* Ames in *Proc. Biol. Soc. Wash.* 34:152. 1921.

*Pleurothallis canae* Ames, *Sched. Orch.* 2:18. 1923; loc. cit. 7:t. 13. 1924.

Caespitose epiphytic herbs 3–22 cm. tall, ordinarily 10–15 cm. tall. Secondary stems about 0.5–6 cm. long, covered with sheaths, much shorter than the leaves. Leaves (when mature) 4.5–12 cm. long and 0.2–1.2 cm. broad, linear-oblong to oblong-lanceolate, obtuse or rarely acutish, gradually attenuated to the base. Inflorescence a few- to several-flowered raceme, often unilateral, usually exceeding the leaves but rarely shorter. Dorsal sepal 5–11 mm. long and 2–3.5 mm. broad, lanceolate to oblong-lanceolate, acute or acuminate, cucullate, keeled dorsally, pubescent within (especially laterally) to glabrous. Lateral sepals 5.5–11 mm. long, oblong-lanceolate to suborbicular-ovate, acute, cucullate to cochleate, connate almost to their apices or rarely connate only  $\frac{2}{3}$  their length, pubescent within (especially laterally) to glabrous, keeled dorsally along the mid-ribs. Petals 2–3.5 mm. long and 1–1.5 mm. broad, elliptic-lanceolate to ovate, obtuse or acute, more or less arcuate, apex rarely trilobulate, the base auriculate. Lip 3–4 mm. long and 2.5–3 mm. broad, occasionally papilliferous, 3-lobed; lateral lobes basal or sub-basal, from lanceolate-falcate to subtriangular, usually erect; lamina oblong, obtuse, with 2 large lamellate or ridge-like calluses on the basal half or two thirds, and with an elongate bipartite central callus at the base.

Mexico, Guatemala, Costa Rica, and Panama.

CHIRIQUÍ: Bajo Chorro, alt. 1800 m., *Davidson 170*; Río Quebrada, alt. 1700 m., *Killip 3540*; "Chiriquí," alt. 1200–1650 m., *Powell 236, 278, 289, 3176*; *Wagner 25*; Monte Lirio, alt. 1300–1900 m., *Seibert 199, 212, 213, 271*; Bajo Mona, alt. 1500–2000 m., *Woodson, Allen & Seibert 1004*. COCLÉ: vicinity of La Mesa, alt. 1000 m., *Allen 2307*. DARIÉN: Cana and vicinity, *Williams 971*.

One of the most variable of the species of *Pleurothallis* in Panama. The description is taken from all of the specimens available. A critical study may show some of the forms to be varietally distinct. In addition to the Panamanian synonyms listed above the following names seem to belong here also: *Pleurothallis Aguilarii* Ames, *P. amethystina* Ames, *P. Johannis* Schltr., *P. melicoides* Schltr., *P. pompalis* Ames, and *P. vinacea* Ames.

47. *PLEUROTHALLIS GHIESBREGHTIANA* Rich. & Gal. in *Ann. Sci. Nat.* III, 3:16. 1845.

*Pleurothallis racemiflora* Lindl. ex Lodd. *Bot. Cab.* 10: t. 949. 1824, non (Sw.) Lindl. 1824.

*Pleurothallis longissima* Lindl. *Folia Orch. Pleuroth.* p. 31. 1859; Reichb. f. in *Xenia Orch.* 2:114, t. 137, figs. 6–9. 1867; in *Saunders' Ref. Bot.* 2:t. 141. 1882.

*Pleurothallis lyroglossa* Schltr. in *Fedde Rep. Sp. Nov.* 8:566. 1910.

*Pleurothallis Niederleinii* Schltr. in *Beih. Bot. Centralbl.* 36, Abt. 2:396. 1918.

Caespitose or repent epiphytic herbs up to about 6 dm. tall, but usually about 3 dm. tall. Secondary stems 3–18 cm. long, usually shorter than the leaves.



Leaves 4–17 cm. long and 0.9–3 cm. broad, oblanceolate to elliptic-oblong, obtuse or rarely acute, usually attenuated into a short petiole at the base. Inflorescence a few- to usually many-flowered raceme, usually much exceeding the subtending leaves. Dorsal sepal 6–8.5 mm. long and 2.5–4 mm. broad, lanceolate to elliptic-ovate, acute. Lateral sepals 6–8.5 mm. long and together 3–5 mm. broad, elliptic-oblong to oval, acute or obtuse, connate to their apices or nearly so, cucullate. Petals 6–8.5 mm. long and 1.5–3 mm. broad, elliptic-lanceolate to ovate-lanceolate, acute or obtuse, oblique. Lip 3.5–6.5 mm. long and 1.5–3 mm. broad, oblong-pandurate, obtuse, basal portion orbicular, terminal portion oval.

Mexico, British Honduras, Guatemala, Honduras, Costa Rica, Panama, and the West Indies.

CHIRIQUÍ: Cerro Vaca, alt. 900–1136 m., *Pittier 5320*. PANAMÁ: Río La Maestra, alt. 0–25 m., *Allen 63*. VERAGUAS: Bahía Honda, *Taylor 1511*.

48. *PLEUROTHALLIS DOLICHOPUS* Schltr. in *Fedde Rep. Sp. Nov.* 10:394. 1912.

*Pleurothallis lamprophylla* Schltr. loc. cit. 15:205. 1918.

*Pleurothallis poasensis* Ames, *Sched. Orch.* 1:10. 1922; loc. cit. 7: *t. 12*. 1924.

*Pleurothallis peregrina* Ames, loc. cit. 6:67. 1923.

Caespitose or repent epiphytic herbs up to about 3.5 dm. tall. Secondary stems up to about 23 cm. long, usually exceeding the leaves. Leaves 5–15 cm. long and 1.3–3.5 cm. broad, elliptic-oblong, obtuse or rarely acute, contracted into a short petiole at the base. Inflorescence 1 or more, few- to many-flowered racemes, subequal to or usually exceeding the leaves. Dorsal sepal 14–23 mm. long and 2–3.5 mm. broad, linear-lanceolate to lanceolate, ciliate and puberulent to glabrous within. Lateral sepals 9–22 mm. long and 1.5–3 mm. broad, linear-lanceolate to lanceolate, acuminate, ciliate and puberulent to glabrous within, free almost to their bases. Petals 3–5 mm. long and 1–2 mm. broad, from nearly oblong to oblong-oblanceolate, obtuse. Lip 2.5–5 mm. long and 0.8–2.5 mm. broad, oblong to oblong-obovate, obtuse, the disc with 3 longitudinal calluses and the outer 2 serrated in front but erect and forming the side of the lip below, terminal part of the lip denticulate or entire.

Mexico, Guatemala, Costa Rica, and Panama.

CHIRIQUÍ: Volcán de Chiriquí, alt. 2875 m., *Davidson 1030*; Volcán de Chiriquí, alt. 3500–4000 m., *Woodson & Schery 392*.

Some Mexican specimens have the sepals no more than 6 mm. long, which is unusual. The normal length is about 12 mm.

49. *PLEUROTHALLIS PFAVII* Reichb. f. in *Flora* 69:555. 1886.

*Masdevallia platyrachis* Rolfe in *Gard. Chron.* III, 4:178. 1888.

*Pleurothallis platyrachis* Rolfe in *Jour. Bot.* 28:136. 1890; Hook. f. in *Bot. Mag.* 116: *t. 7129*. 1890.

*Kraenzlinella platyrachis* Rolfe in *Orch. Rev.* 23:326. 1915.

Caespitose epiphytic herbs up to about 30 cm. tall. Secondary stems up to about 2 cm. long. Leaves 7–20 cm. long and 1.2–3 cm. broad, ligulate-oblanceolate, obtuse, coriaceous, attenuated into a petiole at the base. Inflorescence up to



25 cm. long, exceeding the leaves; peduncle ancipitous and winged, with one or more bracts; rachis fractiflex, somewhat flattened or nearly terete, bracts large. Sepals spreading, free nearly to their bases, verrucose within except at the bases, keeled dorsally toward their apices. Dorsal sepal 13–20 mm. long and 4.5–5.5 mm. broad, lanceolate to ovate-lanceolate, acute, cucullate. Lateral sepals 13–20 mm. long and 2–4 mm. broad, lanceolate, acute, connate nearly to their apices. Petals 4–5 mm. long and about 1 mm. broad, ligulate, falcate, verrucose externally. Lip 5–6 mm. long and about 1.5 mm. broad, lanceolate, arcuate, acute, with a pair of inframarginal, lamellate calluses beginning above the base and extending nearly to the apex.

Mexico, Costa Rica, and Panama.

CHIRIQUÍ: "Chiriquí," *Pfau*.

Originally collected in Panama but not reported in recent years.

50. *PLEUROTHALLIS SPECTABILIS* Ames & Schweinf. Sched. Orch. 8:34. 1925.

Caespitose epiphytic herbs up to about 3 dm. tall. Secondary stems up to 1.5 cm. long, covered with loose, tubular sheaths. Leaves 6–13 cm. long and 0.6–1.5 cm. broad, elliptic-oblong to oblong-lanceolate, obtuse or acute, attenuated into a petiole at the base. Inflorescence up to 30 cm. long, much overtopping the leaves; peduncle ancipitous; rachis distichous. Sepals spreading, lanceolate, acute, densely verrucose within except at the bases. Dorsal sepal 15–21 mm. long and 5.5–7.5 mm. broad, cucullate toward the base. Lateral sepals 15–21 mm. long and 4–5.5 mm. broad, arcuate, connate at the base. Petals 3–5 mm. long and 1–1.5 mm. broad, oblong-falcate, slightly broader toward the obtuse or tridentate thickened apex, slightly verrucose. Lip 4.5–6 mm. long and about 2 mm. broad, oblong, obtuse or slightly retuse, base of lip thin, upper  $\frac{2}{3}$  somewhat fleshy and with a pair of inframarginal, lamellate calluses which extend nearly to the apex.

Costa Rica and Panama.

VERAGUAS: Santa Fé, alt. 460 m., *Powell* 382.

51. *PLEUROTHALLIS MURICATA* Schltr. in Fedde Rep. Sp. Nov. 10:293. 1912.

*Pleurothallis sororoa* Schltr. loc. cit. 294.

*Pleurothallis diuturna* Schltr. in Fedde Rep. Sp. Nov. Beih. 17:19. 1922; Ames, Sched. Orch. 7: t. 19. 1924.

Caespitose or repent, epiphytic herbs up to about 5 dm. tall. Secondary stems up to 5.5 cm. long, usually angled and sulcate. Leaves 8–17 cm. long and 1.2–4 cm. broad, oblong-ligulate, obtuse, coriaceous, somewhat attenuated to the base. Inflorescence up to 23 cm. long, peduncle and rachis terete, the rachis somewhat fractiflex and distichous, much exceeding the leaves. Sepals free nearly to their bases, fleshy, keeled along the mid-nerve dorsally. Dorsal sepal 6–18 mm. long and 4–7 mm. broad, broadly lanceolate, acute, cucullate. Lateral sepals 13–19 mm. long and 3–5.5 mm. broad, lanceolate, acute, cucullate. Petals 5–10 mm. long and 1.2–2.5 mm. broad, linear-elliptic to elliptic-oblong-lanceolate, acute, slightly arcuate, obscurely auriculate at the base, adnate to the base of the column. Lip



6–10 mm. long and 2–3.2 mm. broad, unguiculate, ligulate, lobulate toward the base; the claw short, thin; lamina fleshy, the surface slightly muricate, arcuate, with two small, erect, lateral lobes toward the base. Ovary muricate.

Mexico to Panama, possibly Peru.

COCLÉ: vicinity of El Valle de Antón, alt. 800 m., *Allen 2294, Hunter & Allen 361*.  
VERAGUAS: near Santiago, alt. 150–220 m., *Powell 172*.

52. *PLEUROTHALLIS CRENATA* Lindl. in *Gard. Chron.* 6:207. 1846; Lindl. *Folia Orch. Pleuroth.* p. 38. 1859.

*Masdevallia aperta* Kränzl. in *Fedde Rep. Sp. Nov.* 17:430. 1921.

*Pleurothallis Hunteriana* Schltr. in *Fedde Rep. Sp. Nov. Beih.* 17:20. 1922.

*Pleurothallis hamata* Rolfe ex Ames, *Sched. Orch.* 3:8. 1923.

*Pleurothallis aperta* Ames, *Sched. Orch.* 7:17, fig. 3. 1924.

Small repent or caespitose herbs up to about 15 cm. tall. Secondary stems up to 1 cm. long. Leaves 4.5–13 cm. long and 1–2.7 cm. broad, broadly to narrowly oblanceolate, acute or obtuse, attenuated into a petiole at the base. Inflorescence about half as long as the leaves, 1- to several-flowered, peduncle and rachis terete. Sepals more or less spreading, minutely papilliferous within, keeled or winged along the mid-nerve dorsally, the keel or wing extending onto the ovary, the apices subterete; dorsal sepal 11–18 mm. long and about 3–3.5 mm. broad, lanceolate, cucullate; lateral sepals 12–18 mm. long and 1.5–3 mm. broad, lanceolate, acute, connate to, or nearly to, the middle. Petals 4–4.5 mm. long and 1.5–2 mm. broad, oblong-lanceolate, somewhat pandurate, acute, slightly oblique. Lip 4.5–5 mm. long and 1.5–2 mm. broad, oblong-lanceolate, obtuse or acutish, the sides erect and fleshy, disc densely papillose-verrucose.

Mexico, Costa Rica, and Panama.

CHIRIQUÍ: without locality, alt. 1200–1500 m., *Powell 245, 277, 3436*.

53. *PLEUROTHALLIS FILAMENTOSA* (A. & S.) L. Wms. in *Bot. Mus. Leafl. Harv. Univ.* 8:144. 1940.

*Restrepia filamentosa* Ames & Schweinf. *Sched. Orch.* 8:19, fig. 3. 1925.

Small, caespitose, epiphytic herbs up to 12 cm. tall. Secondary stems up to about 6.5 cm. long, slender, covered with loose, chartaceous sheaths. Leaves 4–5.5 cm. long and 1–1.7 cm. broad, elliptic or elliptic-lanceolate, acute, attenuated into a short petiole at the base. Inflorescence shorter than the leaves; peduncle

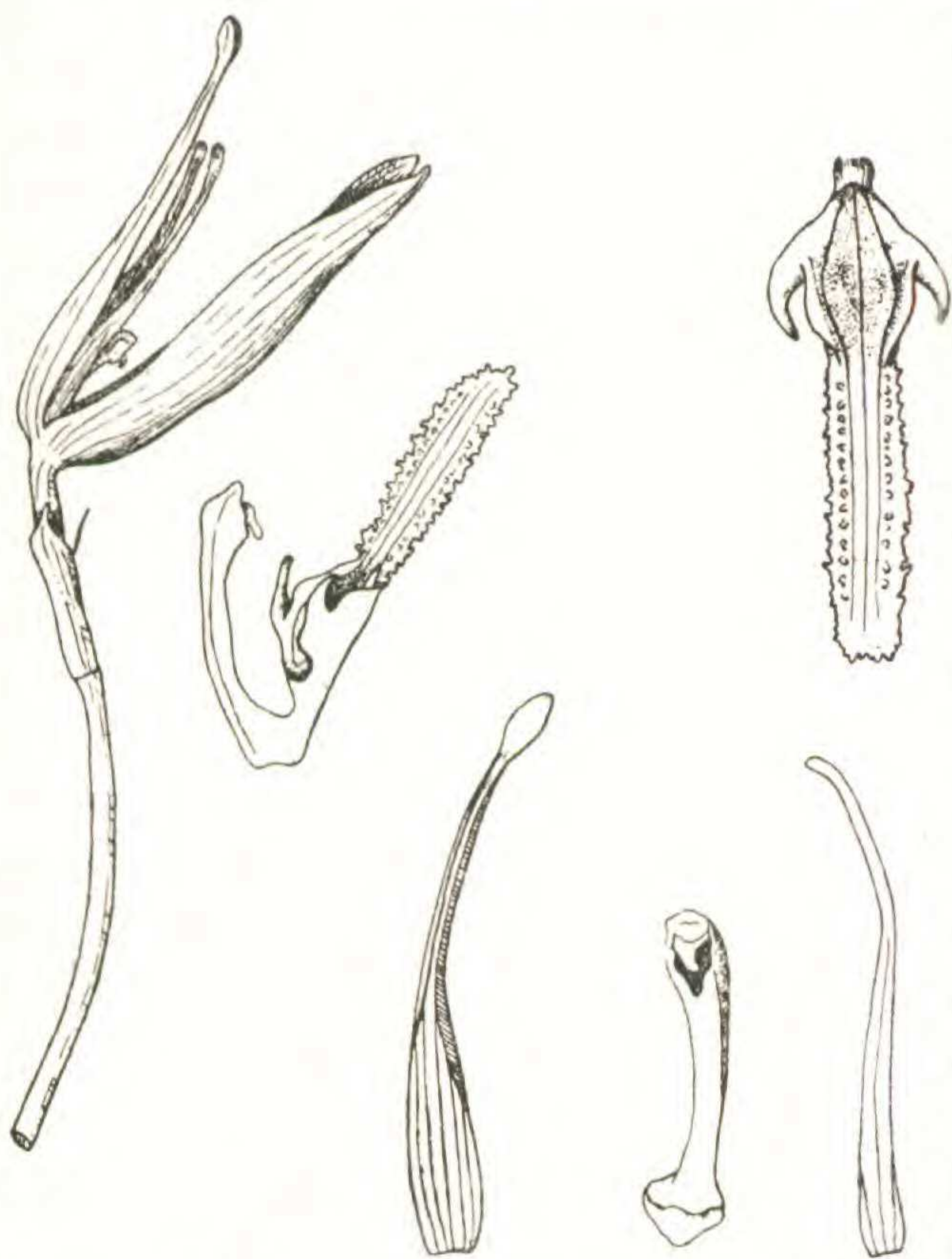


Fig. 116. *Pleurothallis filamentosa*



slender, 1-flowered, pedicel with a short filamentose appendage on the anterior side. Dorsal sepal 13–16 mm. long and about 2 mm. broad, linear-lanceolate, the terminal half subfiliform and the apex thickened and clavate, free nearly to the base. Lateral sepals 14–16 mm. long and together 4–5 mm. broad, connate nearly to their apices, puberulent within, the lamina oblong-lanceolate, the free apices acute. Petals 10–12 mm. long, about 0.5 mm. broad, subfiliform, apices thickened and clavate. Lip about 6–7 mm. long and 2–2.5 mm. broad, 3-lobed, lanceolate-ligulate, obtuse, short-unguiculate; the basal  $\frac{1}{3}$  oval, fleshy, with a small porrect lobe near the middle on either side; terminal  $\frac{2}{3}$  linear-oblong, denticulate, the surface more or less verrucose.

Panama.

CHIRIQUÍ: Cerro Horqueta, alt. 1500–1700 m., *Powell 344*.

Very closely allied to *P. subserrata* (Schltr.) L. Wms.

54. PLEUROTHALLIS SUBSERRATA (Schltr.) L. Wms. in Bot. Mus. Leaf. Harv. Univ. 8:144. 1940.

*Restrepia subserrata* Schltr. in Fedde Rep. Sp. Nov. Beih. 19:291. 1923.

Small, caespitose, epiphytic herbs up to about 15 cm. tall. Secondary stems up to about 9 cm. long, covered with loose, chartaceous sheaths which disintegrate with age. Leaves 4–6 cm. long and 1.5–3 cm. broad, elliptic to ovate, obtuse, contracted into a short petiole at the base. Inflorescence as long as or exceeding the leaves; peduncle 1 or more from each stem, slender, 1-flowered. Dorsal sepal 1.6–2 cm. long and about 0.2 cm. broad, narrowly lanceolate, with the terminal half subfiliform and the apex clavellate, free nearly to the base. Lateral sepals 1.6–2 cm. long and together 0.5–0.65 cm. broad, connate nearly to their apices; the lamina oblong-elliptic, the apices acute. Petals about 1.3 cm. long, 0.75 cm. broad at the base, with a narrow, entire or denticulate lamina at the base, but the remainder subfiliform and the apex clavellate. Lip 8–10 mm. long and 2–3 mm. broad at the base, lanceolate-ligulate, acute or obtuse, short-unguiculate; the basal  $\frac{1}{3}$  oval, fleshy, with a small porrect lobe on either side near the middle; terminal  $\frac{2}{3}$  linear-oblong, serrulate, the surface slightly verrucose.

Costa Rica and Panama.

CHIRIQUÍ: vicinity of "New Switzerland," central valley of Río Chiriquí Viejo, alt. 1800–2000 m., *Allen 1384*; Bajo Chorro, alt. 2000 m., *Davidson 116*.

55. PLEUROTHALLIS XANTHOPHTHALMA (Reichb. f.) L. Wms. in Bot. Mus. Leaf. Harv. Univ. 8:144. 1940.

*Restrepia xanthophthalma* Reichb. f. in Hamb. Gartenzeit. 21:300. 1865.

*Restrepia Lansbergii* "Reichb. f.", sensu Hook. in Bot. Mag. 87:t. 5257. 1861.

*Restrepia Powellii* Schltr. in Fedde Rep. Sp. Nov. Beih. 17:25. 1922.

*Restrepia Tonduzii* Schltr. loc. cit. 19:291. 1923.

Caespitose epiphytic herbs up to 2 dm. tall. Secondary stems up to about 12 cm. long, slender, covered with several loose, ancipitous sheaths. Leaves 3.5–8



cm. long and 0.6–3.5 cm. broad, elliptic to lanceolate to ovate, acute or obtuse, attenuated into a short petiole at the base. Inflorescence 1- to several-flowered, very much shorter than the leaves, rarely reaching to the middle of the subtending leaf. Dorsal sepal 10–12 mm. long and 1–2 mm. broad, linear-lanceolate, becoming subfiliform above, with the apex clavellate. Lateral sepals 8–12 mm. long, together 4–6 mm. broad, connate nearly to their apices, the lamina oval to obovate. Lip 5–6.5 mm. long and 2–2.5 mm. broad, ovate-lanceolate, obtuse, with two slender lateral lobes near the base, terminal part somewhat narrowed and ciliate or denticulate.

Mexico, Guatemala, Honduras, Costa Rica, and Panama.

CHIRIQUÍ: "Chiriquí," alt. 1280 m., *Powell 123*.

#### EXCLUDED OR OBSCURE SPECIES

PLEUROTHALLIS BARBAE Schltr. in Fedde Rep. Sp. Nov. Beih. 19:104. 1923.

Specimens so determined belong elsewhere.

PLEUROTHALLIS PERPUSILLA Reichb. f. in Bot. Voy. Herald, 215. 1852.

Obscure, possibly a species of *Stelis*.

PLEUROTHALLIS PHYLLOCARDIA Reichb. f. Beitr. Orch. Centr.-Am. 97. 1866.

The species is obscure. Specimens so determined belong elsewhere.

PLEUROTHALLIS PHYLLOCARDIODES Schltr. in Fedde Rep. Sp. Nov. Beih. 19:193. 1923.

A plant so determined, from Darién Province, is probably an undescribed species but the material is not good.

PLEUROTHALLIS PYROSODES Reichb. f. in Gard. Chron. n. s. 6:386. 1876; Schltr. loc. cit. 17:22. 1922.

The specimen reported by Schlechter is *P. Brighamii* S. Wats.

#### 24. MALAXIS Solander ex Swartz

MALAXIS Solander ex Sw. Nov. Gen. & Sp. Pl. Prodr. 119. 1788; in Svenska Vet.-Akad. Handl. 21:233. 1800; Fawc. & Rendle, Fl. Jam. 1:41. 1910.

*Acbroanthes* Raf. in Med. Repos. N. Y. 5:352. 1808.

*Microstylis* Nutt. Gen. N. Am. Pl. 2:196. 1818; Lindl. Gen. & Sp. Orch. Pl. 18. 1830; Benth. & Hook. Gen. Pl. 2:494. 1883; Pfitzer in Engler & Prantl. Nat. Pflanzenf. II, 6:130. 1888; Ridley in Jour. Linn. Soc. 24:308-351. 1888.

Small, erect or repent, terrestrial or epiphytic herbs with cormous pseudobulbs or repent stems. Section EUMALAXIS with cormous, usually hypogaeous, pseudobulbs bearing 1 or 2 leaves. Section BLEPHARIGLOTTIS with more or less elongated stems and leaves scattered along them. Leaves 1–3, continued at the base into a sheathing petiole, membranaceous, the lamina usually broad. Scape or peduncle slender, usually elongated. Inflorescence a spicate or subumbellate raceme; flowers small. Sepals free or the laterals connate, subequal, spreading. Petals equal to the sepals or usually shorter, narrow to subfiliform. Lip erect or spreading, sessile, entire or lobed, usually cordate or auriculate, with the auricles embracing the column, usually broader than the sepals, concave at the base (or plane in



*Malaxis Wendlandii*). Column very short, terete, usually at right angles to the axis of the lip; anther erect or suberect, persistent, 2-celled, the cells often nearly separate; pollinia 4, 2 in each cell of the anther, waxy, their long axis parallel to the long axis of the column or nearly so; caudicle none.

About 200 species distributed in the temperate and tropical regions with the greatest concentration in tropical Asia and Oceania.—A fascinating but difficult genus, closely allied to *Liparis*, and with no really good characters separating the two. The section BELPHARIGLOTTIS is entirely tropical American, and while it resembles some species of *Liparis* its characters are more those of *Malaxis*.

- a. Plants with short, slender, leafy stems.
  - b. Lip 5.5–9.5 mm. long; petals 4.5–7 mm. long..... 10. *M. TIPULOIDES*
  - bb. Lip 3–4 mm. long; petals 3–3.5 mm. long..... 9. *M. BLEPHARIGLOTTIS*
- aa. Plants with short bulbous stems which are not leafy along their length but bear 1 or 2 leaves.
  - b. Leaf 1; inflorescence a narrow raceme or spike.
    - c. Lip simple in front, not tridentate, trilobate, nor retuse..... 1. *M. MAJANTHEMIFOLIA*
  - cc. Lip not simple in front, either tridentate, trilobate, or retuse.
    - d. Lip obovate-triangular; anther rostrate..... 11. *M. WENDLANDII*
    - dd. Lip not obovate-triangular; anther not rostrate.
      - e. Lip tridentate at the apex; inflorescence a dense spike..... 3. *M. SOULEI*
      - ee. Lip trilobate in front; inflorescence a subaxillary raceme..... 2. *M. PITTIERI*
  - bb. Leaves 2; inflorescence a subumbellate raceme.
    - c. Lip ciliate or denticulate..... 8a. *M. PARTHONII* var. *DENTICULATA*
  - cc. Lip neither ciliate nor denticulate.
    - d. Lip tridentate or trilobate near the apex.
      - e. Lip subquadrate in outline, with linear-lanceolate basal auricles..... 6. *M. WOODSONII*
      - ee. Lip not subquadrate in outline, without linear-lanceolate auricles.
        - f. Lip without basal auricles..... 4. *M. SIMILLIMA*
        - ff. Lip with erect or uncinatate basal auricles..... 5. *M. EXCAVATA*
    - dd. Lip entire in front.
      - e. Lip suborbicular to transversely oblong-oval, 3.5–7 mm. broad..... 8. *M. PARTHONII*
      - ee. Lip ovate-triangular to ovate-lanceolate; 1.5–2.5 mm. broad.... 7. *M. FASTIGIATA*

1. *MALAXIS MAJANTHEMIFOLIA* Cham. & Schlecht. in *Linnaea* 6:59. 1831; Ames & Schweinf. in *Bot. Mus. Leafl. Harv. Univ.* 3:121. 1935; L. Wms. in *Ann. Missouri Bot. Gard.* 26:281. 1939.

*Malaxis ichtbiorhynca* Rich. & Gal. in *Ann. Sci. Nat.* III, 3:18. 1845.

*Malaxis cochleariaefolia* Rich. & Gal. loc. cit.

*Microstylis majanthemifolia* Reichb. f. in *Linnaea* 22:834. 1849.

*Microstylis cochleariaefolia* Reichb. f. loc. cit.

*Microstylis ichtbyorrhyncha* Reichb. f., *Beitr. Orch. Centr.-Am.* 99. 1866.

*Achroanthus maianthemifolia* Greene, *Pittonia* 2:184. 1891.

*Microstylis elegantula* Schltr. in *Fedde Rep. Sp. Nov.* 3:17. 1906.

Small, erect, terrestrial herbs from 1 to 4 dm. tall. Stem short, cormous or fleshy, covered with scarious sheaths. Leaves long-petiolate, one to each plant; lamina 2.5–12 cm. long and 2–9.5 cm. broad, ovate-cordate to broadly ovate-cordate, acute or obtuse, membranaceous; petiole elongated, sheathing and enclosing the peduncle for half its length (thus the lamina seemingly borne near the middle of the otherwise naked part of the peduncle). Inflorescence an elongate, many-flowered raceme. Dorsal sepal 2.5–3 mm. long and 1–1.5 mm. broad, elliptic-oval



to elliptic-ovate, obtuse or acutish. Lateral sepals 2.3–2.8 mm. long and about 1.5 mm. broad, oval, obtuse or acute, slightly arcuate, shortly connate at the base. Petals 2–3 mm. long and 0.3–0.7 mm. broad, linear-lanceolate, acute, slightly arcuate. Lip 2–3 mm. long and 1.5–2.5 mm. broad, ovate-cordate or triangular-cordate, acute or obtuse, somewhat concave. Anther bipartite with 2 fused pollinia in each part of it.

Mexico, Guatemala, Honduras, and Panama.

CHIRIQUÍ: Boquete, alt. 1515 m., *Davidson 801*; Casita Alta, Volcán de Chiriquí, alt. 1500–2000 m., *Woodson, Allen & Seibert 830*; Potrero Muleto de Volcán de Chiriquí, alt. 3500–4000 m., *Woodson & Schery 474*.

2. MALAXIS PITTIERI (Schltr.) Ames in Proc. Biol. Soc. Wash. 35:84. 1922.

*Microstylis Pittieri* Schltr. in Fedde Rep. Sp. Nov. 12:203. 1913.

Erect terrestrial herbs up to about 2 dm. tall. Stems short, fleshy or cormous, unifoliate. Leaves long-petiolate; lamina 2–3 cm. long and about 2–2.5 cm. broad, broadly ovate-cordate, acute or short-acuminate, membranaceous; petiole sheathing the lower half of the peduncle. Inflorescence a subraceme, many-flowered raceme up to about 9 cm. long. Dorsal sepal 2.2–2.7 mm. long and about 1 mm. broad, elliptic-oblong, obtuse. Lateral sepals about 2–2.3 mm. long and together about 1.7 mm. broad, suborbicular-ovate, connate  $\frac{3}{4}$  their length. Petals about 2.5 mm. long and 0.5 mm. broad, linear, acute or obtuse. Lip 2.2–2.5 mm. long and 2–2.5 mm. broad, 3-lobed, the disc cochleate and with a carinate U-shaped ridge in front; mid-lobe triangular-lanceolate; lateral lobes oblong-ovate.

Known only from Panama.

CHIRIQUÍ: between Alto de Las Palmas and the top of Cerro de la Horqueta, alt. 2100–2268 m., *Pittier 3277*.

A rare species, distinctive because of the lobing of the lip.

3. MALAXIS SOULEI L. Wms. in Ann. Missouri Bot. Gard. 21:343. 1934.

*Microstylis montana* Rothr. in Wheeler, Rept. U. S. Geog. Surv. W. 100th Merid. 6(Bot.):264. 1878.

*Achroanthes montana* Greene, Pittonia 2:183. 1891.

*Malaxis montana* O. Ktze. Rev. Gen. Pl. 2:673. 1891, non Blume.

*Malaxis macrostachya* "(La Llave & Lex.) O. Kuntze," sensu Ames & Schweinf. in Bot. Mus. Leaf. Harv. Univ. 3:120. 1935, hardly of La Llave & Lexarza nor of Lindley nor of Kuntze.

Erect terrestrial herbs up to about 4.5 dm. tall. Stems short, fleshy or cormous, probably hypogaeous, covered with the scarious bases of the sheaths and petiole. Leaves 1 on each growth; lamina 2.5–16 cm. long and 1–6 cm. broad, elliptic-ovate to oblong or oblong-ovate to obovate, variable, acute or obtuse, membranaceous; petiole elongated and enclosing the peduncle for a third to a half of its length and thus the lamina borne well above the ground. Inflorescence an elongated, densely flowered spike. Dorsal sepal 1.5–2.5 mm. long and about 0.8–1.2 mm. broad, lanceolate-ovate to elliptic-oblong, acute or obtuse. Lateral sepals 1.5–2.2 mm. long and 0.8–1.2 mm. broad, oblong-elliptic, obtuse. Petals



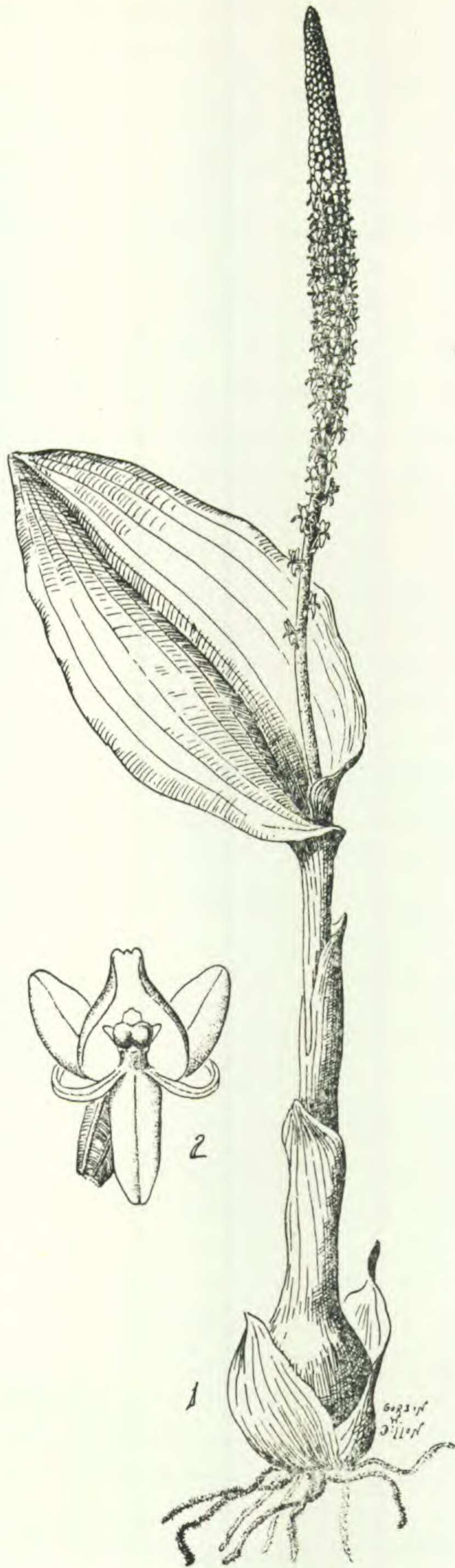


Fig. 117. *Malaxis Soulei*

(237)



1.2–2 mm. long and 0.2–0.6 mm. broad, linear or linear-lanceolate, obtuse. Lip 1.7–2.5 mm. long and 1.4–2.5 mm. broad, ovate-cordate to suborbicular-cordate, auriculate, cochleate, apex tridentate.

Arizona, Mexico, Guatemala, Costa Rica, and Panama.

CHIRIQUÍ: Volcán de Chiriquí, alt. about 3025 m., *Davidson 999*; Llanos del Volcán, alt. 1120–1200 m., *Seibert 128*; Casita Alta, Volcán de Chiriquí, alt. about 1500–2000 m., *Woodson, Allen & Seibert 804, 835*; Casita Alta to Cerro Copete, alt. 2300–3300 m., *Woodson & Schery 371*.

4. MALAXIS SIMILLIMA (Reichb. f.) O. Ktze. Rev. Gen. Pl. 2:673. 1891.

*Microstylis simillima* Reichb. f. Beitr. Orch. Centr.-Am. 101. 1866.

Erect terrestrial herbs up to about 3.5 dm. tall. Stems short, cormous, hypogaeous, bifoliate, covered with the scarious bases of the sheaths and petiole. Leaves long-petiolate; lamina 3.5–14 cm. long and 2–7 cm. broad, lanceolate-ovate to broadly ovate, acuminate, membranaceous, reaching to about the middle of the peduncle. Inflorescence a short, dense, many-flowered, subumbellate raceme. Dorsal sepal 3–4 mm. long and 1.2–1.8 mm. broad, broadly lanceolate or ovate-lanceolate, acute or obtuse. Lateral sepals 3–4 mm. long and 1–1.5 mm. broad, ligulate-lanceolate to elliptic-lanceolate, acute, connate to the middle or less. Petals 2–2.5 mm. long and 0.2–0.5 mm. broad, linear, acute or obtuse. Lip 3.5–4.5 mm. long and 1.5–3 mm. broad, ovate-lanceolate, acute, cochleate, with 2 small lateral or inframarginal teeth below the apex.

Costa Rica and Panama.

CHIRIQUÍ: Bajo Chorro, alt. 1900 m., *Woodson & Schery 685*.

5. MALAXIS EXCAVATA (Lindl.) O. Ktze. Rev. Gen. Pl. 2:673. 1891; L. Wms. in Bot. Mus. Leafl. Harv. Univ. 6:75. 1938.

*Microstylis excavata* Lindl. in Bot. Reg. 24:Misc. p. 51. 1838.

*Microstylis hastilabia* Reichb. f. Beitr. Orch. Centr.-Am. 101. 1866.

*Malaxis hastilabia* O. Ktze. loc. cit.

*Microstylis Carpintera* Schltr. in Beih. Bot. Centralbl. 36, Abt. 2:381. 1918.

*Malaxis Carpintera* Ames, Sched. Orch. 7:157. 1922.

*Malaxis uncinata* Ames & Schweinf. Sched. Orch. 10:15. 1930.

Erect terrestrial herbs from a rhizome, up to about 4.2 dm. tall. Stems short, cormous, bifoliate, covered with the scarious sheaths of the petioles and bracts. Leaves long-petiolate; lamina 5–12 cm. long and 2–7 cm. broad, ovate-lanceolate to ovate, acute or acuminate, membranaceous, paired, reaching to about the middle of the peduncle; petioles sheathing the lower part of the peduncle. Inflorescence a short, dense, many-flowered, subumbellate raceme. Dorsal sepal 3.5–4 mm. long and 1.5–2.7 mm. broad, elliptic-oblong to ovate, obtuse. Lateral sepals 3–4 mm. long and 1.3–2.2 mm. broad, oblong-oval to oblong-ovate, obtuse, free to the base or nearly so. Petals 2.5–3.5 mm. long and 0.3–0.4 mm. broad, linear (or linear-lanceolate), obtuse. Lip 3–4 mm. long and 2.5–4 mm. broad, oblong-cordate to triangular-cordate, auricles at the base erect or uncinata, trilobulate at the apex, disc excavated and gibbous, the cavity with a longitudinal ridge.



Mexico, Costa Rica, Panama, Colombia, Ecuador, Peru, Bolivia, Argentina, and Brazil.

CHIRIQUÍ: Boquete, alt. about 3025 m., *Davidson 1002*; vicinity of Monte Lirio, alt. 1300-1900 m., *Seibert 175*; Casita Alta to Cerro Copete, alt. 2300-3300 m., *Woodson & Schery 368*; Potrero Muleto to summit of Volcán de Chiriquí, alt. 3500-4000 m., *Woodson & Schery 461*.

Description drawn from Central American material. Some South American specimens have smaller flowers. A variable species.

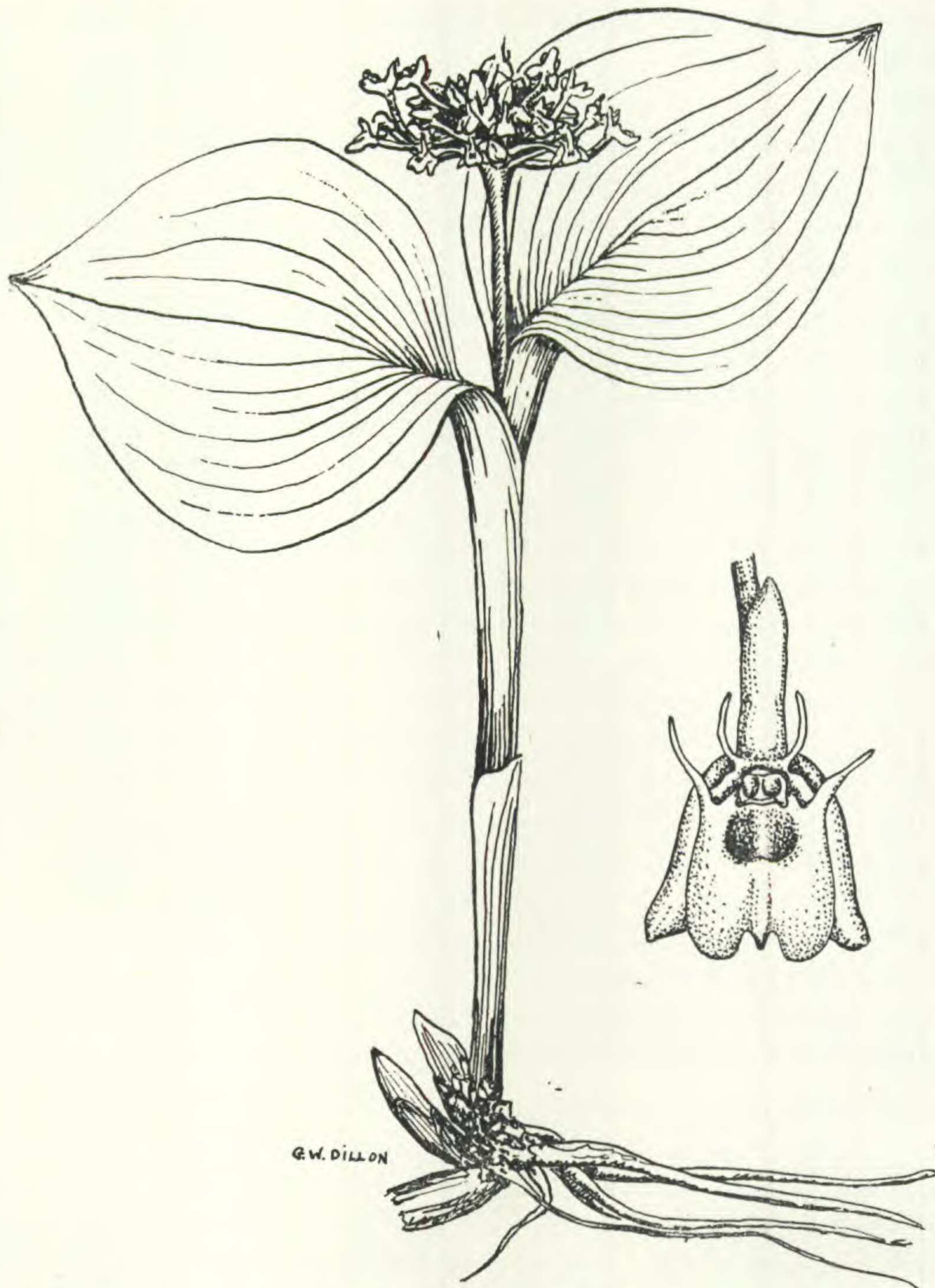


Fig. 118. *Malaxis Woodsonii*

6. MALAXIS WOODSONII L. Wms. in Ann. Missouri Bot. Gard. 26:281, t. 21, figs. 1-2. 1939.



Small terrestrial herbs up to about 15 cm. tall. Stems short, cormous, covered with the bases of the petioles and bracts. Leaves long-petiolate; lamina 1.5–5.5 cm. long and 1.3–4.5 cm. broad, broadly ovate, obtuse or acute, crenulate or obscurely serrate, membranaceous, borne about the middle of the peduncle. Inflorescence many-flowered, subumbellate. Sepals 2.5–4 mm. long and 1.5–2.5 mm. broad, broadly lanceolate, obtuse. Petals about 2.5–3 mm. long, filiform. Lip 3.5–5 mm. long and 3–3.5 mm. broad, quadrate in outline; apex 3-lobate, the mid-lobe small and exceeded by the lateral lobes in length, lateral lobes large, rounded, obtuse, the basal auricles linear-lanceolate, acute, erect; disc with two shallow cavities.

Panama.

CHIRIQUÍ: Casita Alta, Volcán de Chiriquí, alt. about 1500–2000 m., Woodson, Allen & Seibert 831, 832.

Well distinguished from all other species in Central America by the basal auricles of the lip.

7. *MALAXIS FASTIGIATA* (Reichb. f.) O. Ktze. Rev. Gen. Pl. 2:673. 1891; Ames & Schweinf. in Bot. Mus. Leafl. Harv. Univ. 3:116. 1935.

*Microstylis fastigiata* Reichb. f. in Linnaea 22:834. 1849.

*Microstylis brachyrrhynchos* Reichb. f. in Flora 71:152. 1888.

*Malaxis brachyrrhyncha* Ames in Proc. Biol. Soc. Wash. 35:84. 1922, sphalm.

*Malaxis Lankesteri* Ames, Sched. Orch. 4:7. 1923.

Small erect terrestrial herbs up to about 6 dm. tall. Stems short, cormous, bifoliate, tunicate. Leaves long-petiolate; lamina 3–16.5 cm. long and 1.5–9.5 cm. broad, oval to broadly ovate, obtuse or acuminate, membranaceous, paired, reaching to about the middle of the peduncle; petiole sheathing the lower part of the peduncle. Inflorescence a many-flowered, short or rarely somewhat elongated, subumbellate raceme. Dorsal sepal 3–5 mm. long and 1–1.6 mm. broad, lanceolate to ovate-lanceolate, obtuse. Lateral sepals 3–4.5 mm. long and 1–1.8 mm. broad, lanceolate to elliptic-ovate, obtuse, free to their bases. Petals 2–3.5 mm. long and 0.3–0.4 mm. broad, linear or linear-ligulate. Lip 2–4 mm. long and 1.5–2.5 mm. broad, ovate-triangular to ovate-lanceolate, the apex from rounded to subrostrate, acute or obtuse, disc excavated and gibbous, fleshy, the cavity with a longitudinal ridge.

Mexico, Guatemala, Honduras, Costa Rica, and Panama.

CHIRIQUÍ: Llanos del Volcán, alt. 1120–1200 m., Seibert 327.

*Malaxis fastigiata* and *M. brachyrrhyncha* are often considered to be distinct species. The first is supposed to have the lip distinctly rostrate; the second is not supposed to be rostrate (although the type is short-rostrate). This seems to be the only method of separating the two and, as the two conditions intergrade completely, the two species should be considered synonymous.

8. *MALAXIS PARTHONII* Morr. in Bull. Acad. Roy. Brux. 5:485. 1838; L. Wms. in Ann. Missouri Bot. Gard. 26:281. 1939.

*Microstylis histionantha* Lk., Kl. & Otto, Ic. Pl. Rar. Hort. Berol. 1:11, t. 5. 1841; Hook.



in Bot. Mag. 70: t. 4103. 1844.

*Microstylis Parthonii* Reichb. f. in Walp. Ann. 6:206. 1861.

*Microstylis Brenesii* Schltr. in Fedde Rep. Sp. Nov. Beih. 19:167. 1923.

Erect terrestrial herbs up to about 6 dm. tall. Stems short, cormous, bifoliate, covered with the scarious bases of the petioles and bracts. Leaves 8–18 cm. long and 3–12 cm. broad, ovate-lanceolate to broadly ovate or suborbicular, acute or acuminate, membranaceous, paired, reaching to about the middle of the scape, their petioles sheathing the lower part of the peduncle. Inflorescence a short, many-flowered, subumbellate raceme. Dorsal sepal 4.5–6 mm. long and 1.5–2.5 mm. broad, lanceolate-ligulate to elliptic, obtuse. Lateral sepals 3–5 mm. long and together up to 6 mm. broad, connate to the middle or beyond or free to the base, suborbicular in outline or separately lanceolate-ovate, obtuse. Petals 2–4 mm. long, filiform. Lip 3.5–5 mm. long and 3.5–7 mm. broad, orbicular to transversely oblong-oval, concave toward the base.

Mexico, Salvador, Costa Rica, Panama; reported from Peru but a small-flowered form if so.

CANAL ZONE: vicinity of Salamanca Hydrographic Station, alt. about 80 m., *Woodson, Allen & Seibert 1581*. CHIRIQUÍ: Finca Lérida to Boquete, alt. 1300–1700 m., *Woodson, Allen & Seibert 1172*.

8a. *MALAXIS PARTHONII* Morr. var. *DENTICULATA* (Reichb. f.) Ames, Hub. & Schweinf. in Bot. Mus. Leaflet. Harv. Univ. 3:40. 1934.

*Microstylis Parthonii* Reichb. f. var. *denticulata* Reichb. f., Beitr. Orch. Centr.-Am. 100. 1866.

*Microstylis Wercklei* Schltr. in Beih. Bot. Centralbl. 36, Abt. 2:382. 1918.

*Malaxis Wercklei* Ames in Proc. Biol. Soc. Wash. 35:85. 1922.

Much like the species except the floral parts smaller, the lip denticulate or ciliate and the cavity at the base of the lip definitely bipartite.

Costa Rica and Panama.

CHIRIQUÍ: vicinity of upper Río Chiriquí, Monte Lirio, alt. 1300–1900 m., *Seibert 170, 221*; valley of upper Río Chiriquí, alt. 1300–1900 m., *White & White 17*; vicinity of Casita Alta, alt. 1500–2000 m., *Woodson, Allen & Seibert 832bis*.

9. *MALAXIS BLEPHARIGLOTTIS* (Schltr.) Ames in Proc. Biol. Soc. Wash. 35:84. 1922.

*Microstylis blephariglottis* Schltr. in Fedde Rep. Sp. Nov. 12:202. 1913.

Small, erect, epiphytic (or terrestrial?) herbs up to about 4.5 dm. tall. Stems up to about 2 cm. long, densely leaved. Leaves 4.5–12 cm. long and 0.8–1.5 cm. broad, elliptic to oblanceolate-ligulate, acute or acuminate, membranaceous. Inflorescence densely flowered, elongated; bracts up to about 8 mm. long, lanceolate, acuminate, entire or lacerate, cucullate. Sepals 2.5–3 mm. long and 1–1.5 mm. broad, elliptic-lanceolate to elliptic-oblong, obtuse, slightly cucullate. Petals 3–3.5 mm. long and 0.4–0.6 mm. broad, linear-ligulate, obtuse. Lip 3–4 mm. long and 2–3 mm. broad, oblong-obovate, obtuse or acute, slightly constricted above the base, the base emarginate and callus thickened, margins ciliate or ciliate-lacerate.

Costa Rica and Panama.



CHIRIQUÍ: above El Boquete, alt. 1650–1925 m., *Maxon 5667*.

Known in Panama only from the original specimen although the locality has been often collected. This species, along with *Malaxis tipuloides* (Lindl.) O. Ktze., belongs to Schlechter's section BLEPHARIGLOTTIS of *Microstylis* (Schlechter, loc. cit. 203). The species of the section (perhaps a dozen) resemble some species of *Liparis* rather closely. The anthers are neither completely erect, as they are supposed to be in *Malaxis*, nor are they incumbent as in *Liparis*. The position of the anther in these genera is controlled by the length of the rostellum, and this species has a relatively long one. It is perhaps important that the pollinia of these two species have their long axis parallel to the long axis of the column, which doubtless indicates an anther nearly erect. The position of the anther has been used in separation because there is hardly a way in which the two genera may be distinguished. Perhaps the relative length of the column would afford a better criterion.

10. *MALAXIS TIPULOIDES* (Lindl.) O. Ktze. Rev. Gen. Pl. 2:673. 1891, as *Malaxis tipulodea*.

*Microstylis tipuloides* Lindl. in Ann. & Mag. Nat. Hist. 15:256. 1845.

*Liparis eustachys* Schltr. in Fedde Rep. Sp. Nov. Beih. 19:91. 1923.

*Liparis fratrum* Schltr. loc. cit. 92; L. Wms. in Ann. Missouri Bot. Gard. 27:282. 1940.

*Liparis tipuloides* Schltr. loc. cit. 91; C. Schweinf. in Bot. Mus. Leafl. Harv. Univ. 6:2. 1938.

Repent or ascending terrestrial herbs often with the stems rooting at the nodes, up to about 7 dm. long. Stems up to about 10 cm. long, densely leaved, slender. Leaves 5–17 cm. long and 0.9–3.5 cm. broad, elliptic to elliptic-oblongate, petiolate, acute, membranaceous. Inflorescence a loose or dense raceme up to about 5–6 dm. long, much exceeding the stems and the leaves. Dorsal sepal 5.5–6 mm. long and 1–2 mm. broad, ligulate, lanceolate, obtuse. Lateral sepals similar to the dorsal but somewhat arcuate. Petals 4.5–7 mm. long, linear or linear-lanceolate, obtuse or acute. Lip 5.5–9.5 mm. long and 3–4.5 mm. broad, elliptic-obovate, acuminate, auriculate, ciliolate, somewhat constricted below the middle.

Costa Rica, Panama, and Colombia.

CHIRIQUÍ: Cerro Punta, alt. 2000 m., *Allen 1528*.

See note on preceding species.

11. *MALAXIS Wendlandii* (Reichb. f.) L. Wms., comb. nov.

*Liparis Wendlandii* Reichb. f. Beitr. Orch. Centr.-Am. 98. 1866.

Small, caespitose, epiphytic herbs up to about 6 dm. tall. Stem a short cormous pseudobulb covered with fibrous sheaths and the bases of the petioles and bracts. Leaf 1, petiolate; lamina 0.9–2 cm. long and 0.5–1.2 cm. broad, oval to sub-orbicular, acute, membranaceous. Inflorescence a few-flowered raceme, the base enfolded by the petiole and the bracts. Dorsal sepal about 3–3.5 mm. long and 1.5–1.7 mm. broad, ovate-lanceolate, obtuse or acutish. Lateral sepals 2.7–3.2



mm. long and about 0.8–1.2 mm. broad, lanceolate to ovate-lanceolate, obtuse or acutish, somewhat arcuate. Petals about 3 mm. long and 0.6–0.7 mm. broad, linear-lanceolate, acute or acuminate. Lip 3–3.5 mm. long and 2–2.6 mm. broad, obovate-triangular, retuse, denticulate, with an umbonate callus toward the base. Column about 0.75 mm. long, at right angles to the lip; anther about 0.75 mm. long, erect or semi-erect, long-rostrate, the rostrum about 0.5 mm. of the length of the anther; rostellum very long.

Costa Rica and Panama.

CHIRIQUÍ: valley of the upper Río Chiriquí Viejo, vicinity of Monte Lirio, alt. 1300–1900 m., *Seibert 195, 216*.

*Malaxis Wendlandii* is a very curious plant which seems to have most of the technical characters of *Malaxis* but a lip like that of *Liparis*, in which genus it was originally placed. The short column, erect or semi-erect anther with separated cells and the long rostellum point to *Malaxis*. The rostrate anther is unusual. The shape of the lip certainly reminds one of the genus *Liparis*.

#### 25. LIPARIS L. C. Rich.

LIPARIS L. C. Rich. in *Mém. Mus. Par.* 4:52, *t. 5, fig. 10*. 1818; Lindl. *Gen & Sp. Orch. Pl.* 26. 1830; Benth. & Hook. *Gen. Pl.* 2:495. 1883; Ridley in *Jour. Linn. Soc.* 22:252-297. 1886.

Small terrestrial or epiphytic herbs with pseudobulbous stems. Leaves few (1–4), petiolate, the base of the petiole enclosing the pseudobulb; lamina membranaceous (in Panama), usually broad. Inflorescence a few- to several-flowered, terminal raceme. Flowers small. Sepals free, subequal, spreading. Petals subequal to the sepals or usually smaller and narrower. Lip erect or spreading, shortly adnate to the base of the column or free, sessile or usually shortly clawed, entire or usually emarginate, 1- to 2-tuberculate at the base, broader than the sepals. Column elongated (compared to that of *Malaxis*), arcuate, semi-terete, footless, usually parallel to the axis of the lip; anther terminal, operculate, incumbent, usually soon deciduous and versatile; pollinia 4, waxy, their long axis at right angles to the long axis of the column or nearly so.

About 200 species in tropical and temperate regions with the greatest concentration in tropical Asia and Oceania. Closely allied to *Malaxis*.

1. LIPARIS ELATA Lindl. in *Bot. Reg.* 14: *t. 1175*. 1828; L. Wms. in *Ann. Missouri Bot. Gard.* 26:282. 1939.

Terrestrial herbs from 13 to 40 cm. tall. Stems short, becoming fleshy or cormous, sheathed with the bases of the petiole. Leaves petiolate, usually 3 or 4 from each stem, rosulate; lamina 5–30 cm. long and 2.5–11 cm. broad, elliptic-oval to ovate, acute or acuminate, membranaceous. Inflorescence a more or less lax, few- to many-flowered raceme. Dorsal sepal 6–7 mm. long and 2–2.2 mm. broad, oblong-lanceolate, obtuse. Lateral sepals 4–6 mm. long and 2–3 mm. broad, oval to ovate, obtuse, arcuate. Petals 5–5.7 mm. long and 1–1.5 mm.





Fig. 119. *Liparis elata*

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broad, linear to linear-oblongate, obtuse, arcuate. Lip 4–5.5 mm. long and 4–5 mm. broad, obovate to flabellate, truncate or emarginate, fleshy, bituberculate at the base. Column long, arcuate.

Florida, Mexico, Guatemala, Honduras, Costa Rica, Panama, the West Indies, Brazil, Colombia, and Peru.

CANAL ZONE: Quebrada Salamanca, alt. 70 m., *Dodge, Steyermark & Allen 16988*; Salamanca Hydrographic Station, Río Pequeñí, alt. about 80 m., *Woodson, Allen & Seibert 1580*. PANAMÁ: Cerro Campana, alt. 600–800 m., *Allen 2677*; foothills east of city, *Powell 243*.

A widespread and somewhat variable species.

## 26. HEXISEA Lindl.

HEXISEA Lindl. in Hook. Jour. Bot. 1:7. 1834.

*Euthonaea* Reichb. f. in Bot. Zeit. 10:772. 1852.

Caespitose epiphytic herbs. Stems simple or branched, terete or angled, segmented, thickened or pseudobulbous. Leaves few, usually one or two from the apex of each segment, usually deciduous annually. Inflorescence from the apex of the growths, few-flowered, short; flowers small but highly colored. Sepals similar, erect or spreading, narrow, the laterals often shortly connate at the base. Petals similar to the sepals. Lip simple or lobulate, adnate at the base with the column, base of the lamina geniculate and usually callus-thickened. Column short, adnate to the lip below the middle; clinandrium 3-lobed; anther operculate, incumbent; pollinia 4, collateral, waxy.

About a half dozen species in Central and South America. Living material should prove instructive as to the origin of the inflorescence and new growth, for both apparently come from the apex of the preceding growth, which is somewhat unusual. The monotypic genus *Alemania* Llave & Lex. (The only one of the Llave & Lexarza orchids for which a type is known to exist) should possibly include *Hexisea*. Florally they are not to be distinguished but the vegetative growth may keep them separate until more is known about them.

1. HEXISEA BIDENTATA Lindl. in Hook., Jour. Bot. 1:8. 1834.

*Diothonaea imbricata* Lindl. Sert. Orch. t. 40, f. 1. 1841.

*Epidendrum oppositifolium* Rich. & Gal. in Ann. Sci. Nat. III, 3:21. 1845.

*Diothonaea oppositifolia* Reichb. f. in Linnaea 22:842. 1849.

*Euthonaea oppositifolia* Reichb. f. in Bot. Zeit. 10:772. 1852.

*Euthonaea imbricata* Reichb. f. loc. cit.

*Hexisea oppositifolia* Reichb. f. in Walp. Ann. 6:470. 1862.

*Hexisea imbricata* Reichb. f. loc. cit.

Caespitose epiphytic herbs up to about 4 dm. tall. Stems segmented, the terminal growth producing flowers and then a new growth and leaves from its apex, simple or branched, the segments subcylindric or fusiform. Leaves 2.5–16 cm. long and 0.3–1 cm. broad, linear to linear-ligulate, obtuse or retuse, coriaceous, borne from the apex of the segment of the stem. Inflorescence a short,



few-flowered raceme. Flowers usually bright red. Sepals 10–14 mm. long and 2.5–4 mm. broad, lanceolate or elliptic-lanceolate, acute, the laterals somewhat oblique. Petals 10–13 mm. long and 2–3 mm. broad, linear-lanceolate to linear-oblong, acute. Lip 8–13 mm. long and 2.5–4 mm. broad, oblong-ob lanceolate, obtuse or acute, base of the lamina geniculate and the angle or "knee" usually callus-thickened, claw adnate with the basal half of the column.

Mexico, Honduras, Nicaragua, Costa Rica, Panama, Colombia, and British Guiana.

CHIRIQUÍ: "Chiriquí," alt. 1200 m., *Powell* 64, 3113, 3156, 3157, 3161, 3190, 3192, 3214, 3504. PANAMÁ: San Juan Hills, east of Panama City, *Powell* 333, 3146, 3420; "Panama": Panama et Colombia occidentalis, in 1831, *Cuming* 1297. VERAGUAS: headwaters of the Río Cañazas, alt. 300–600 m., *Allen* 195; Bahia Honda, *Taylor* 1509.

The genus should possibly be referred to *Alemania* Llave & Lex.

(To be concluded in Part III, Fasc. 3)